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EDITORIAL

THE COMMUNITY AS A FORCE IN THE CONTROL OF TUBERCULOSIS

Modern epidemiological methods in the control of communicable diseases make it imperative for workers in the field to know where, when, who, and how many any given disease attacks. The swiftest and most efficient way to the heart of this problem in the field of tuberculosis is through X-ray surveys of large population groups, preferably those that compose large metropolitan areas, which present for our attention all manner of social complexity, racial variation, and economic resources. In addition, it is important to consider the bearing that time has upon the quality and completeness of such information. Hilleboe [1] has recently pointed out that with money, workers, and equipment, a majority of the adult population of the United States can be given X-ray examinations of the chest within a period of five years. With the status, incidence, and racial aspects of tuberculosis thus known, the complexity of the problem can be ascertained and future action planned.

At the beginning of organized control movements, it was believed that the most effective means of discovering the exact nature of the tuberculosis problem in the United States was through surveys of industrial, occupational and racial groups. However, it was soon discovered that knowledge thus secured was at best spotty and was likely to be misleading when the whole population of the country was considered. It was thereupon determined to delve into those vast reservoirs of human beings which are our great cities. Here, for our study, are all manner and races of men, all conditions of lives, and all the maladies that are suffered by mankind. Through a prompt discovery of the tuberculosis problem in the larger cities of our country,

[1] "The Time Element in Tuberculosis Control," Public Health Reports, 62: 23, Tuberculosis Control Issue No. 16, June 6, 1947.

a reasonably exact knowledge of the extent of the problem could be realized, public action stimulated, and professional forces joined.

City-wide X-ray surveys can be conducted with relative economy of means and money. Concentration of personnel, machinery, and educational devices within densely populous communities provides, in certain respects, quicker and more valuable results than do studies that are conducted in sparsely settled areas. Previous experience in cities already surveyed and preliminary studies of other communities indicate that if present facilities are fully utilized and if newly discovered cases are given realistic disposition, the increased case load of tuberculosis will not present a grave problem to the community. Seventy percent of all new cases discovered by mass X-ray survey are minimal and do not constitute a grievous public health problem. Most of those cases will be noninfectious; the disease process will be incipient; and the probability of serious progression, with adequate follow-up, will be slight. Such cases can be cared for by private physicians and public clinics, assisted by public health nurses and medical social workers. Sanatorium beds now occupied by noninfectious cases can be given over to far-advanced virulent disease which constitutes a menace to the local population.

Minimal, noninfectious cases are private physicians' cases, not sanatorium cases. Indeed, the private practitioner can be a major force in the future control of tuberculosis in the communities of our country if he undertakes to participate in follow-up activities after the survey has been completed. Through his efforts, minimal tuberculosis can be checked and, in individual cases, never become serious. Under the physician's care, needless distress and tragedy can be avoided. As a consequence of his vigilance, the general practitioner can reduce measurably the occurrence of deaths from tuberculosis.

Often communities can afford to enlarge present clinic and hospital facilities when they cannot afford to build new institutions. Recruiting professional personnel is, of course, always a serious problem everywhere. However, resolute efforts to procure and then train professional workers will be productive of fruitful results.

An aroused community makes for organized action. An informed community acts collectively as a social weapon against any threat to its proficient existence. A community aware of the problem confronting it and so organized as to hasten effective solution is, beyond all debate, the principal force in a program to control tuberculosis. Isolated leaders and their followers, no matter how well trained or how profoundly dedicated, have little potency without the strength inherent in the human and economic resources of mobilized communities of men. Everywhere this ideal of unanimity of purpose and systematized direction will have to be deeply instilled in the minds of

community-conscious men and women throughout our Nation, for by now it must be plain that the fight against tuberculosis is a social and economic movement as well as a disease problem. We now have enough information to be confident that an awakened awareness of the people is the chief tool for triumph.

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ALCOHOL AS A DISINFECTANT AGAINST THE TUBERCLE BACILLUS

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It has been known for half a century that water is essential to the disinfectant action of ethyl alcohol, that absolute alcohol is relatively ineffective against dry bacteria, and that a final concentration of 50 to 70 percent appears to be optimum (*1*). For wet surfaces, 80 to 96 percent alcohol is recommended; for dry, 50 to 80 percent (*1, 2*). For skin sterilization, Price (*3*) showed that 70 percent by weight is the most effective strength. Tanner and Wilson (*4*) among others found that the germicidal action of aliphatic alcohols increases with the molecular weight as far as the amyl derivative (5 carbon atoms) and decreases through octyl to undecyl alcohol (11 carbon atoms), which is comparable in action to ethyl. Of the water-soluble alcohols, the most effective was normal propyl.

In a review of the literature on the subject, Soberheim (*2*) brought out these points: (1) Alcohol is a good disinfectant against vegetative bacteria, killing many species in 1 to 5 minutes, but it is without effect on spores. (2) Where the bacteria are in water suspension, the germicidal action of the alcohol is directly proportional to its percentage. (3) With optimum strengths of alcohol, dry bacteria are killed less easily than those in suspension (Russ). (4) Mere increase in the humidity of the room serves to increase the susceptibility of dry microorganisms to alcohol. (5) It may be that the cell wall of the dry bacterium must absorb water and swell before alcohol can enter (Gruber, Hansen, et al.) and that the drying and hardening action of the higher percentage alcohols makes penetration of the inner protoplasm more difficult. (6) The coagulating action of higher percentage alcohols on albumin is hindered by their strong dehydrating effect, and this may account for the inability of such alcohols to precipitate the nucleoproteins within the unwetted cell (Hailer). (7) The quantity of bacteria subjected to the action of alcohol is not of critical importance (Eisenberg and Kalska). (8) Protein, pus, and other substrates increase the disinfection time of alcohol, but not to a

considerable extent. (9) The bactericidal power of alcohol is directly proportional to the temperature, and is increased by the presence of small amounts of acids, alkalis, or salts.

In 1929 and subsequently, the action of alcohols on tubercle bacilli was investigated by Hailer (*5*, *6*, *7*, *8*). Pieces of cloth were soaked in heavy suspensions of tubercle bacilli of various strains, human and bovine (*6*). Alcohol was poured over the cloth in a dish, and at the chosen time (2, 3, 5, 10 and 15 minutes), the action was stopped by the addition of water. Viability was proved by animal inoculation.

In these experiments Hailer found that ethyl alcohol, 50, 60, and 80 percent by weight, killed tubercle bacilli sometimes in 2 minutes, in most cases in 3 minutes, and always in 5 minutes. A 95 percent concentration usually killed in 2 to 5 minutes, always in 10 minutes; and 40 percent usually in 5 to 10, always in 15 minutes. Normal propyl alcohol, 25, 32, 40, and 48 percent by weight, was effective, sometimes in 2 and usually in 3 to 5 minutes; 40 and 48 percent, always in 10 minutes; 60 percent, always in 3 minutes. Isopropyl alcohol, 40, 48, and 60 percent, sterilized some specimens in 2 minutes, more in 3 and 5, and most in 10 minutes; 32 percent was always effective in 10 minutes; 48 percent in 15 minutes.

Dealing with bits of cloth soaked in strongly positive sputum, Hailer and Heicken (*7*) found that in most trials, 80 and 96 percent ethyl alcohol killed the bacilli in 5 minutes; 25 and 32 percent propyl, in 5 minutes; 40 and 48 percent isopropyl, in 10 minutes. For disinfection of the hands, Hailer and Heicken (*7*) recommended immersion in the effective alcohol for 3 minutes, allowing it to dry on the hands for an additional 2 minutes. They point out that the propyl alcohols are less dangerous for hand disinfection because the lower percentages required are less inflammable. In another study (*8*) Hailer found that tubercle bacilli in one-half mm. thick sputum smears, dried on pieces of wood and linoleum, were dead after 2 hours' exposure to 32 percent isopropyl alcohol. Shorter periods of exposure were not tested.

In a "tuberculocidal time-test" in which 0.5 cc. of the reagent was incubated with 0.5 cc. of a suspension of tubercle bacilli, Cohn (*9*) found 95 percent ethyl alcohol to be effective in a contact period of 5 minutes, but not in 2 minutes; and 20 percent alcohol, to be ineffective.

EXPERIMENTAL PROCEDURE

The purpose of the following experiments was to determine the effect of alcohols in various dilutions upon dry and wet tubercle bacilli.

Tubercle bacillus suspensions were made, according to a previously described method (*10*), from a virulent human strain designated as 88, the subcultures varying from 4 to 7 weeks in age. Moisture was made

first with 0.25 percent sodium hydroxide, earlier dilutions in 0.01 percent sodium hydroxide, the later and final dilutions in water. Sputum specimens were pooled, shaken by machine for one-half hour with glass beads, incubated 2 to 8 hours, and shaken again with beads for one-half hour with or without dilution or the addition of tubercle bacillus suspensions.

Alcohol dilutions were prepared according to directions in the United States Pharmacopoeia from *Alcohol* USP—"not less than 92.3 percent by weight, corresponding to 94.9 percent by volume, at 15.56° C. of C_2H_5OH," subsequently designated as 95 percent alcohol. What is described as 50 percent alcohol was *Alcohol Dilutum* USP—48.4 to 49.5 volumes percent, 41 to 42 weight percent. The absolute alcohol used was *Alcohol Dehydratum* USP—"not less than 99 percent by weight." Weight percent dilutions were made by adding grams of absolute alcohol to sufficient grams of water to make a total weight of 100.

Periods of exposure to the alcohols were carefully timed by stop watch, and where required, a team of several persons was used to carry out the tests, in order that the timing be accurate and the details of the technique uniform. Action of the alcohols was stopped by dilution with water. All tests were made at room temperature, which varied from 20° to 22° C., with extremes of 18° and 23° C. Often a variation of 2 degrees occurred during one experiment. All containers were kept covered as much as possible. For controls, the preparations of tubercle bacilli were exposed to sterile water instead of alcohol.

Viability of tubercle bacilli was tested by culture and by guinea pig inoculation. When sputum was tested, it was prepared for culture and inoculation by a half-hour contact with sodium hydroxide at a concentration of 0.25 percent. Sometimes culture was made from sputum without any treatment. Otherwise, it was made 30 minutes after admixture with an equal amount of 2.5 percent oxalic acid. Material for culture was not neutralized; that for animal inoculation was washed. When clean tubercle bacillus preparations were tested, there was no treatment prior to culture and animal inoculation. The samples were centrifuged before inoculation and, except where indicated, before culture. Culture was on Petragnani's medium, two tubes for each sample, two drops to a tube (experiments 1 to 5); or a 1-ounce bottle for each sample, 0.1 cc. to a bottle (experiments 6 to 10). The cultures were read at 1 and 2 months. The guinea pigs were inoculated subcutaneously in the right inguinal region. They were autopsied at 1 month if clinically positive; otherwise, at 2 months. Visceral disease and demonstration of acid-fast bacilli were taken as evidence of the presence of living tubercle bacilli.

I. The Effect of Ethyl Alcohol on Tubercle Bacilli in Suspension

Suspensions of tubercle bacilli were made in water or in negative sputum. The suspensions were added to the alcohol, mixed, and at the proper time, the action was stopped by dilution with water. Transfers were made with pipettes equipped with rubber bulbs, the added liquid being ejected beneath the surface of the receiving liquid. A second pipette was used for mixing.

Sputum suspensions.—In the first two experiments, the sputum was diluted 1 to 10 with water, and 0.1 cc. containing 0.1 mg. of tubercle bacilli was added to 0.9 cc. of alcohol. A final dilution with water to 50 cc. was used to stop the action. In the third experiment, the sputum was diluted with an equal amount of water. One-tenth cc. containing 0.1 mg. of tubercle bacilli was added to 9.9 cc. of alcohol, and at the proper intervals, 1-cc. samples were removed to 50 cc. of sterile water in large centrifuge tubes. In all cases sediments were cultured both untreated and after admixture with oxalic acid. Since there are no disagreements in results, they may be tabulated together for the three experiments as shown in table 1.

TABLE 1.—*The effect of ethyl alcohol on tubercle bacilli in sputum suspension. Experiments 1, 2, 3*

Strength of alcohol in percent (by volume)	Amount of growth on cultures [1]								
	Exposure period in minutes								
	0	¼	½	1	5	10	20	30	60
99 plus (absolute)	----------	++	0	0	0	0	----------	----------	----------
95	----------	0	0	[2] 0	[2] 0	[2] 0	0	0	----------
70	----------	+	0	0	[2] 0	[2] 0	0	0	----------
50	----------	++	+	0	0	0	----------	0	0
30	----------	++++	++++	++++	+++	+++	----------	+++	+
Control	++++	----------	----------	----------	----------	----------	----------	----------	----------

[1] 0=no colonies.
+=1 to 2 colonies.
++=3 to 10 colonies.
+++=11 to 60 colonies.
++++=61 or more colonies.
[2] 2 tests.
[3] 3 tests.

Water suspensions.—Here 1 cc. of a suspension containing 1 mg. of tubercle bacilli was mixed with 99 cc. of alcohol. At the proper time, 1-cc. samples were removed, and mixed with 50 cc. of water. Each item was tested once; both culture and guinea pig inoculation were used. The results are shown in table 2.

The results for water and sputum suspensions were closely similar. Absolute and 95 percent alcohol rendered them negative to culture and animal inoculation in 30 seconds; 70 percent, in 1 minute. Ninety-five percent alcohol appeared to be slightly better than either absolute or 70 percent, killing in 15 seconds. There was some difference in the

TABLE 2.—*Effect of ethyl alcohol on tubercle bacilli in water suspension. Experiment 4*

Strength of alcohol in percent (by volume)	Amount of growth showing on cultures and disease in guinea pigs [1]													
	Exposure period in minutes													
	0		¼		½		1		5		10		60	
	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.
99 plus (absolute)			0	++++	0	0	0	0	0	0		0		0
95			0	0	0	0	0	0	0	0				
70			+++	+++	0	++	0	0	0	0				
50			++++	++++	++++	++++	++++	++++	++++	++++				
30			++++	++++	+++	++++	+	+++	0	0	+++	++++	0	++++
Control	++++	+++												

[1] 0=no colonies on culture or no disease in the animal at 2 months.
+=1 to 2 colonies on culture or minimal disease in the animal at 2 months.
++=3 to 10 colonies on culture or minimal disease in the animal at 1 month.
+++=11 to 60 colonies on culture or moderate disease in the animal at 1 month.
++++=61 or more colonies on culture or extensive disease in the animal at 1 month.

TABLE 3.—*Effect of ethyl alcohol on tubercle bacilli in dried sputum smears. Experiments 5, 6*

Strength of alcohol in percent (by volume)	Smear	Number of colonies on culture and amount of disease in guinea pigs [1]																	
		Exposure period in minutes																	
		0		¼		½		1		2		5		10		30		60	
		Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.
99 plus (absolute)	Thick			100+	+++	100+	+++	100+	+++			100+	+++						
	Thin													30	+++	1	+++	5	++
95	Thick			100+	+++	100+	+++	100+	+++			100+	+++						
	Thin													26	++	0	0	0	0
70	Thick			100+	+++	78	+++	5	++			0	++						
70 (by weight)	Thin					4	+++	0	0	0	0	0	0	0	0	0	0		
50	Thick					44	+++	7	+++			0	0	0	0				
	Thin					4	++	0	0	0	0	0	0	0	0				
30	Thick													38	+++			0	+++
	Thin																		
Control	Thick	100+	+++																
	Thin	100+																	

[1] +=minimal disease in animal at 2 months.
++=minimal disease in animal at 1 month.
+++=moderate disease in animal at 1 month.
++++=extensive disease in animal at 1 month.

results with 50 percent alcohol, its effective period of action being 1 minute in experiment 3, and between 5 and 10 minutes in experiment 4. Thirty percent alcohol was relatively ineffective.

II. Tubercle Bacilli in Dried Smears

Naturally positive sputum or a water suspension of tubercle bacilli was dried on glass cover slips in the dark. The various alcohol dilutions were placed in Coplin jars. Cover slips were dropped into the jars and, at the proper intervals, removed with sterile forceps to sufficient water or dilute sodium hydroxide solution to stop the action. They were then shaken mechanically for 7 minutes with a measured amount of water or 0.25 percent sodium hydroxide, and processed for culture or animal inoculation. It was necessary to scrape off the water suspension film with a sterile applicator stick prior to shaking.

Dried sputum smears.—Five or six strongly positive tuberculous sputum specimens were pooled, incubated, and shaken. Five hundredths of a cc. of homogenized sputum (containing 25,500,000 stainable tubercle bacilli per cc.) was spread over approximately two-thirds of the area of 22 mm. square, glass cover slips in experiment 5. In experiment 6 the sputum (containing 6,700,000 tubercle bacilli per cc.) was diluted with an equal amount of water prior to shaking. This time 0.05 cc. amounts of the preparation were spread over measured areas of 6 square cm. on large cover slips. Thus it will be seen that in experiment 5 the smears are about 18 times as thick as those in experiment 6.

In experiment 5, one cover slip was used for culture and one for inoculation. They were shaken with 7 cc. of sodium hydroxide. Part of each sediment was planted directly and part after treatment with oxalic acid. In experiment 6 the covers were shaken with 10 cc. sodium hydroxide, and the sediment divided for culture and animal inoculation. The 70 percent alcohol in experiment 6 was prepared according to weight.

The results of experiments 5 and 6 are shown in table 3.

Smears dried from water suspensions.—In experiment 7, 0.05-cc. amounts of a water suspension containing 0.05 mg. of tubercle bacilli were spread over areas of 3 sq. cm. on cover slips. Culture was done without centrifuging. The 70 percent alcohol was prepared according to weight. The results are shown in table 4.

With dried smears, as well as with suspensions, there was no important difference between sputum and water preparations in the susceptibility of the tubercle bacilli to alcohol. Contrary to the effect on tubercle bacilli in suspension, the higher alcohol strengths here were relatively inactive, the middle strengths most active. Fifty percent alcohol, which killed in one-half to 5 minutes, appeared

TABLE 4.—*Effect of ethyl alcohol on tubercle bacilli dried from water suspensions. Experiment 7*

Strength of alcohol in percent (by volume)	Number of colonies showing on culture							
	Exposure period in minutes							
	0	¼	½	1	2	5	10	30
99 plus (absolute)		47	42	65	73	2	4	46
95		46	89	63	23	2	6	1
70 (by weight)		23	6	3	0	0	0	0
50		45	8	0	0	0	0	0
Control	(1)							

[1] Solid growth or 2,500±.

somewhat superior as a disinfectant to 70 percent, which killed in one-half to 10 minutes. The thick sputum smears required longer exposure than the thin smears for death of the micro-organisms. Thus in the case of exposure to 50 percent alcohol, bacilli in the thin smears were dead at 1 minute, and those in the thick smears survived 1 minute and succumbed before 5 minutes had passed. The vast majority of bacilli are killed in the first few seconds of alcohol exposure, as shown in table 4.

Experiment 8 was designed to show simultaneously the difference between the effect of strong and weak alcohol on tubercle bacilli in suspension and in dried smears. Here 1 cc. of a water suspension containing 10 mg. of tubercle bacilli was mixed with 99 cc. of alcohol. The dried smears were prepared by spreading 0.1 cc.-portions of a water suspension containing 0.04 mg. tubercle bacilli over areas of 3 sq. cm. on cover slips. In each case the final plantings were made without centrifuging, and the calculated amount cultured was 0.0002 mg. of tubercle bacilli. The results are shown in table 5.

TABLE 5.—*Comparison between effects of strong and weak ethyl alcohol on tubercle bacilli in water suspension and in dried smears. Experiment 8*

Tubercle bacilli preparation	Strength of alcohol in percent (by volume)	Number of colonies on culture								
		Exposure period in minutes								
		0	¼	½	1	2	5	10	30	60
Water suspension	95		9	0	0	0	0	0	0	0
	50		(2)	276	16	0	0	2	0	0
	Control	(1)								
Dried smears	95		88	68	28	25	20	6	1	0
	50		0	0	0	0	0	0	0	0
	Control	292								

[1] Solid growth or 2,500±.
[2] Solid growth.

This experiment shows in summary the results of the previous study: Ninety-five percent alcohol was highly effective against wet tubercle bacilli, but 50 percent required between 10 and 30 minutes

to assure death. On the other hand, 95 percent alcohol was relatively ineffective against the dried bacilli, and 50 percent killed them in 15 seconds.

III. The Effect of Isopropyl Alcohol on Tubercle Bacilli in Dried Sputum Smears

In experiment 6, one of the trials on thin sputum smears was made with 91 percent isopropyl alcohol by weight. Here tubercle bacilli survived 10 minutes, but failed to show growth after an exposure of 30 minutes. In experiment 7, 91 percent isopropyl alcohol, in action against smears dried from water suspensions, failed to kill the tubercle bacilli in 1 minute, but succeeded in an exposure period of 2 minutes. (Not shown in the tables.)

Dilutions of isopropyl alcohol were made according to weight percent, assuming the source to be pure. In experiment 9 the source was "Isopropyl Alcohol, Anhydrous, Commercial (Shell)—not less than 99 percent pure—specific gravity at 20° C., 0.785 to 0.787." In experiment 10 the source was "Alcohol Propyl (iso) 99 percent—Baker—specific gravity at 25° C., 0.784." In both experiments, 0.05-cc. portions of pooled, naturally positive sputum, diluted 1 to 1 with water, were spread over 6-sq. cm. areas on glass cover slips and dried. The sputum was processed as described in II. In experiment 9, the stainable bacillary count was 20,500,000 per cc.; in experiment 10, it was 14,223,000. After removal from the cover slips, the material was prepared for culture in experiment 9 and for culture and guinea pig inoculation in experiment 10, by treatment with one-quarter percent sodium hydroxide and centrifugation. The results are shown in table 6.

The disinfectant action of isopropyl alcohol against dried tubercle bacilli appears to be parallel to that of ethyl alcohol in the upper and middle strengths, but surpasses it in the lower strengths. The most effective range was 30 to 80 percent. Even in 20 percent dilution, the alcohol was usefully disinfectant; but in 91 and 99 percent strengths, its activity dropped off markedly.

Here again, one may see that the overwhelming majority of the bacilli were killed within the first few seconds of contact with the alcohol.

DISCUSSION

Tubercle bacilli are remarkably sensitive to the action of alcohol. They appear to be fully as susceptible as other bacteria and subject to the same mechanism of bactericidal action. When moisture is present, the higher alcohol strengths are most effective; when absent, the middle strengths are most effective, and in the case of isopropyl alcohol, the middle and lower strengths. The presence of additional substrate in the form of sputum did not seem to diminish the disin-

TABLE 6.—*Effect of isopropyl alcohol on tubercle bacilli in dried sputum smears Experiments 9, 10*

Strength of alcohol in percent (by weight)	Experiment 9								
	Number of colonies showing on culture								
	Exposure period in minutes								
	0	¼	½	1	2	5	10	30	60
99			154	128	51	14	8	0	11
91			92	61	12	1	0	0	0
70			126	0	0	0	0	0	0
50			0	2	0	0	0	0	0
30			1	2	0	0	0	0	0
Control	648								

Strength of alcohol in percent (by weight)	Experiment 10														
	Number of colonies showing on culture and amount of disease in guinea pigs [1]														
	Exposure period in minutes														
	0	¼		½		1		2		5	10	30	60	120	
	Cult.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult.	G. P.	Cult	Cult.	Cult.	Cult.	Cult.	
99												0	0	4	
80		3	+++	1	++	0	0	0	0						
70		4	0	1	0	0	0	0	0						
60		0	++	0	0	0	0	0	0						
50		6	+++	0	0	0	0	1	0						
20						57		2		0	0	0			
Control	1,420														

[1] +=minimal disease at 2 months.
++=minimal disease at 1 month.
+++=moderate disease at 1 month.
++++=extensive disease at 1 month.

fectant action except when the smears were increased several times in thickness. Even then the diminution was slight. Variation in the quantity of tubercle bacilli exposed to alcohol action showed no constant effect on the numbers surviving, although this point was not systematically investigated.

While there were variations in technique between the different experiments, and while no attempt was made to carry out statistically significant repetitions of each test, the results were surprisingly uniform and consistent. Hailer's technique differed from ours in that numbers of bacilli and amounts of sputum were probably much larger, most of his preparations were wet, and his exposure periods were not as closely timed. In general our data indicate a more rapid action, with disinfection in periods as short as 15 seconds. The conditions of our experiments were exaggerated, employing larger numbers of bacilli and thicker layers of sputum than are likely to be present under ordinary conditions of contamination.

Ninety-five percent ethyl alcohol (by volume) appears to be most active against wet tubercle bacilli; 50 percent ethyl or 30 to 80 percent isopropyl (by weight), against dry. If one strength were to be used for all purposes, perhaps 70 percent would be best. We did not show a critical difference between the effect of 70 percent alcohol by volume and by weight, but our experiments were not designed to investigate this point. Isopropyl alcohol, thought it was not tested against wet tubercle bacilli, appears to be at least as effective as ethyl, and in lower dilutions.

While the killing time of the most effective alcohol dilutions varied from 15 seconds to between 5 and 10 minutes, the bacilli were dead in most cases at 1 or 2 minutes. Furthermore, upwards of 99 percent of the individual bacilli did not survive the first few seconds of exposure. On this basis it may be reasonable to recommend an exposure period of 1 to 2 minutes for some types of disinfection, and more or less than this for other types.

Isopropyl and ethyl alcohol, therefore, should be useful and practical disinfectants against the tubercle bacillus in clinics, laboratories, sanatoria, hospitals, and the home. They are relatively nonirritating, inoffensive in odor, and evaporate without leaving an annoying sediment or residuum. Their wetting properties provide a rapid spread over surfaces and promote penetration. Ethyl alcohol is fairly inexpensive for institutions that can procure it tax free. Isopropyl alcohol is reasonable in price and obtainable in all drug stores as "rubbing alcohol" in 50 or 70 percent strengths.

Alcohol seems particularly suitable for skin disinfection. In the case of contamination, hands may be wetted with alcohol and allowed to dry without aid, and the period of exposure will usually be 1 minute or more. While we have no data to show the change in disinfectant power due to changing alcohol percentage during evaporation, it may be expected that even with gross contamination, most or all of the bacilli would be destroyed in this period. Washing the hands with soap, followed by rinsing in 95 percent alcohol while wet, should be highly effective. The use of alcohol on hands or gloves between pneumothorax refills may be of distinct value in preventing cross infections. It should be useful in cleansing the area around tuberculous wounds.

Thermometers kept immersed in 70 percent alcohol (ethyl or isopropyl) should remain noninfectious if the alcohol is changed often enough to keep its strength within the effective range, perhaps once a week if well covered. Various surfaces, dishes, handicraft articles, etc., may be disinfected with alcohol where heat, sunshine, and compound solution of cresol are impractical, and where the alcohol will not

be injurious. Plastics; oiled, painted, varnished, or shellacked surfaces; and some fabrics and dyes may be injured by alcohol.

As a general proposition, the use of alcohol is not recommended where less expensive disinfectants, dry or wet heat, or sunshine may be applied. It is not recommended for disinfection of masses of sputum. Grossly contaminated basins, hard surfaces, and large articles are better treated with compound cresol solution, because of its cleansing action and lower cost.

Alcohol must be used with caution on instruments such as cystoscopes and thoracoscopes containing lens systems that may be held in position with alcohol-soluble cement.

SUMMARY

1. Alcohol is an effective disinfectant against tubercle bacilli.

2. Tubercle bacilli in water or sputum suspension were killed in exposure periods of 15 to 30 seconds by absolute, 95, and even 70 percent ethyl alcohol.

3. Tubercle bacilli in smears dried from sputum or water suspensions were usually killed by 50 and 70 percent ethyl or 30 to 80 percent isopropyl alcohol in 1 to 2 minutes, sometimes in 15 to 30 seconds. In a very thick sputum smear, the bacilli survived the action of 70 percent alcohol 5 but not 10 minutes.

4. The antiseptic action of alcohol was not reduced by the presence of sputum except where the smears were very thick.

5. Ninety-five percent alcohol is best for wet surfaces; 50 percent for dry; and 70 percent for wet or dry.

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DEATHS FROM RESPIRATORY TUBERCULOSIS IN INSTITUTIONS IN THE UNITED STATES, 1945 [1]

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The continued importance of tuberculosis as a cause of death is shown by the fact that the death rate in 1945 was 40.1 per 100,000 population for all forms of the disease. Of the total number of tuberculosis deaths, 48,879 deaths or 92.4 percent in that year were due to respiratory tuberculosis, the most communicable form of the disease. The cost of this disease in loss of life comes high in terms of productive years of life lost because death rates are high at the young adult ages (20–29) as well as for the older adult groups of 45 years and over. The mortality data for 1945 have been reported elsewhere.[2]

Among the principal measures of a tuberculosis control program are early diagnosis of the disease, isolation of persons who may spread the tubercle bacillus, and medical care for all cases. Hospitalization is the most effective means of isolation and it facilitates medical care. Nation-wide statistics comparing tuberculosis mortality in hospitals with tuberculosis mortality outside of institutions show the need for medical care and institutional facilities, as well as the proportion of terminal tuberculosis cases that are not isolated through hospitalization. Although such data are admittedly limited as indices of the true magnitude of tuberculosis as a health problem, they are the most readily available annual index of the disease in the absence of national morbidity figures.

It is generally agreed that not all cases can be hospitalized, but there is no dissent from the thesis that advanced infectious cases are hazards to the health of the community and should be hospitalized to protect other members of the community, as well as to receive necessary medical care. Knowledge of the number of tuberculosis deaths at home and in the various kinds of hospitals and institutions is an aid in the evaluation of the results of those portions of a control program which aim at isolating the infectious cases of tuberculosis. This knowledge is also useful to those planning hospital facilities for the care of the tuberculous. Because the effectiveness of hospitalization in protecting a community from the spread of tuberculosis and in arresting progress of the disease in the individual is related to the length of stay, information as to length of stay in a hospital before

[1] From the Tuberculosis Control Division and the National Office of Vital Statistics.

[2] Pitney, E. H., and Kasius, R. V.: Tuberculosis mortality in the United States and in each State, 1945. Pub. Health Rep., 62: 487–511 (April 4, 1947).

death is useful in estimating the adequacy and success of an isolation program.

Analysis of statistics of tuberculosis deaths in institutions and at home by age, race, and sex, indicates to some extent, the relative degree of hospitalization among the different groups of the population and further needs for hospital care. In addition, when such a study is made over a period of years it may help the hospital planner to determine the future needs which must be met for adequately hospitalizing and providing nursing care for the tuberculosis patient. Information on tuberculosis deaths in institutions and outside institutions by age, race, and sex in the United States in 1945, and on deaths by type of service and type of control of institutions are given in this report. For the entire country this may be used as an index of the extent to which deaths occur in institutions, against which data for smaller areas, available in many State and city health offices can be compared. Less detailed data for the individual States are also included. In addition to the present data on the number of tuberculosis deaths in institutions, such as were reported for 1944 [3] figures are given on length of stay in institutions before death, as reported on the death certificate.

The data on deaths from respiratory tuberculosis by length of stay in institutions and also on deaths from respiratory tuberculosis in institutions by age, race, and sex are based on a 10 percent sample of death certificates for 1945. For 5 States [4] the death certificates do not contain information on length of stay in institutions so that the material on this subject relates to 43 States and the District of Columbia. The sample is taken monthly in State bureaus of vital statistics, but is coded and tabulated centrally in the National Office of Vital Statistics. Further information about the sample is presented elsewhere.[5]

In the classification of hospitals by type of service, a special wing or section of a general hospital operated for tuberculosis cases is regarded as part of that institution so that deaths occurring in such a section are allocated to the general hospital even though they occurred under circumstances essentially the same as those found in a specialized tuberculosis hospital. The same principle is followed in classifying deaths in special buildings or parts of institutions, i. e., the children's building in a general hospital or a tuberculosis wing in a mental institution. Before presenting the statistics on deaths in institutions

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[3] Yerushalmy, J. and Moriyama, I. M.: Tuberculosis mortality in the United States and in each State 1944. Pub. Health Rep., 61: 487-516 (April 5, 1946).

[4] States for which length of stay in institution before death is not available are New Jersey, South Carolina, South Dakota, Texas and Wisconsin.

[5] Pitney, E. H.: Results from the current mortality sample. Am. J. Pub. Health, 36: 475-480 (May 1946).

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and outside of institutions, certain factors that might introduce errors or distortions in the results will be mentioned. There may be a number of instances in which a patient was in a hospital but returned to his home shortly before death. This would be reported as a death in the home, with no indication of the fact that the patient had been hospitalized during most of his illness. Another possibility which must be considered, even though it is difficult to demonstrate, is that tuberculosis deaths in hospitals may be more accurately reported and more completely registered than those taking place in homes, thus raising the proportion of deaths from this cause in institutions. Also, it occasionally happens that a patient in a tuberculosis sanatorium is sent to a general hospital for surgery; he dies while in the general hospital, and the death is allocated to that institution rather than to the tuberculosis hospital. The effect of these various factors on the national figures is not known. Unless otherwise stated, all following references to deaths refer to those from respiratory tuberculosis.

Deaths from respiratory tuberculosis in institutions.—In 1945, 16,959 deaths from respiratory tuberculosis or over one-third of all deaths from this cause, occurred in the home (table 1). Of the 31,920 deaths in institutions, most were in either tuberculosis hospitals (14,239) or general hospitals (12,644). Almost half (15,024) of this load was carried by city or county institutions, while 7,741, or approximately one quarter of hospital deaths were in institutions controlled by the States.

Table 2 gives further information on deaths in institutions by type of service, distributed by type of control. While 54.3 percent of deaths in general hospitals were in city or county controlled institu-

TABLE 1.—*Number and percent of deaths from respiratory tuberculosis in institutions and not in institutions by type of service and type of control: United States, 1939–41 average, 1942–44 average, 1944 and 1945*

Type of service and type of control	Number				Percent			
	1945	1944	1942–44 average	1939–41 average	1945	1944	1942–44 average	1939–41 average
Total	48,879	50,712	52,033	55,444	100.0	100.0	100.0	100.0
Deaths not in institutions	16,959	18,241	19,682	24,519	34.7	36.0	37.8	44.2
Deaths in institutions	31,920	32,471	32,351	30,925	65.3	64.0	62.2	55.8
Type of service:								
General hospitals	12,644	12,607	12,490	12,450	25.9	24.8	24.0	22.5
Tuberculosis hospitals	14,239	14,496	14,561	13,041	29.1	28.6	28.0	23.5
Nervous and mental institutions	3,810	4,056	3,965	3,528	7.8	8.0	7.6	6.4
Other institutions	1,227	1,312	1,335	1,906	2.5	2.6	2.6	3.4
Type of control:								
Federal	3,505	3,428	3,028	2,541	7.2	6.7	5.8	4.6
State	7,741	7,968	8,024	21,871	15.8	15.7	15.4	39.5
County and city	15,024	15,158	15,276		30.7	29.9	29.4	
Nonprofit	4,477	4,805	4,830	4,727	9.2	9.5	9.3	8.5
Proprietary and unknown	1,173	1,112	1,193	1,786	2.4	2.2	2.3	3.2

tions, approximately 40 percent were divided among Federal and other nonprofit hospitals. Over half of all these deaths in tuberculosis hospitals were in those run by cities or counties and one-quarter of the deaths in tuberculosis hospitals were in State-owned institutions. Over 90 percent of these deaths in nervous and mental hospitals were in those hospitals under State ownership.

TABLE 2.—*Number and percent of deaths from respiratory tuberculosis in institutions and not in institutions by type of service by type of control: United States, 1945*

Type of service	Total	Type of control				
		Federal	State	County and city	Nonprofit	Proprietary and unknown
	Number					
In institutions	31,920	3,505	7,741	15,024	4,477	1,173
General hospitals	12,644	2,168	500	6,868	2,797	311
Tuberculosis hospitals	14,239	1,156	3,596	7,595	1,510	382
Nervous and mental institutions	3,810	173	3,514	102	18	3
Other institutions	1,227	8	131	459	152	477
	Percent					
In institutions	100.0	11.0	24.3	47.0	14.0	3.7
General hospitals	100.0	17.1	4.0	54.3	22.1	2.5
Tuberculosis hospitals	100.0	8.1	25.3	53.3	10.6	2.7
Nervous and mental institutions	100.0	4.5	92.2	2.7	0.5	0.1
Other institutions	100.0	0.7	10.6	37.4	12.4	38.9

Table 1 also gives data for 1944 and averages for the war years, 1942–44 and for the prewar period, 1939–41, with which the 1945 figures may be compared. The percent of deaths in the home has decreased steadily from 44.2 in 1939–41 to 34.7 in 1945, with a corresponding increase from 55.8 to 65.3 in the percent of deaths from respiratory tuberculosis in institutions. With this increase in the proportion of deaths in institutions there has been only a small increase in the actual number of such deaths, from an annual average of 30,925 in 1939–41 to 31,920 in 1945, while during the same period the number in the home has decreased almost one third, from 24,519 to 16,959. Thus, there appears to have been a decrease in the opportunities for spread of infection in the home.

The average annual number of deaths from respiratory tuberculosis in tuberculosis sanatoria was 13,041 for 1939–41, or 23.5 percent of all deaths from this cause, while by 1945 there was an increase to 14,239 deaths or 29.1 percent of the total number of respiratory tuberculosis deaths. During this period the percent of respiratory tuberculosis deaths in general hospitals rose from 22.5 to 25.9, but was equivalent to only a very small absolute increase (from 12,450 to 12,644) in the number of deaths in such institutions.

As in previous years, so in 1945, the largest number of respiratory tuberculosis deaths in institutions occurred in those institutions owned by cities or counties. The deaths in Federal institutions in 1939–41 amounted to 4.6 percent of all deaths from respiratory tuberculosis, but had risen to 7.2 percent by 1945. This is undoubtedly a reflection of expansion and increased utilization of military hospitals and veterans' facilities.

At this point it may be of interest to compare the 1945 percent distribution of deaths by type of institutions from nonrespiratory tuberculosis with that for the respiratory form (table 3). The obvious points to be noted are the smaller proportion of deaths from nonrespiratory tuberculosis which occur in the home and the larger percent which take place in general hospitals.

TABLE 3.—*Number and percent of deaths from respiratory tuberculosis and nonrespiratory tuberculosis in institutions and not in institutions by type of service and type of control: United States, 1945*

Type of service and type of control	Number		Percent	
	Respiratory tuberculosis	Tuberculosis (other forms)	Respiratory tuberculosis	Tuberculosis (other forms)
Total	48,879	4,037	100.0	100.0
Deaths not in institutions	16,959	1,049	34.7	26.0
Deaths in institutions	31,920	2,988	65.3	74.0
Type of service:				
General hospitals	12,644	2,420	25.9	60.0
Tuberculosis hospitals	14,239	207	29.1	5.1
Nervous and mental institutions	3,810	119	7.8	2.9
Other institutions	1,227	242	2.5	6.0
Type of control:				
Federal	3,505	285	7.2	7.0
State	7,741	307	15.8	7.6
County and city	15,024	1,036	30.7	25.7
Nonprofit	4,477	1,198	9.2	29.7
Proprietary and unknown	1,173	162	2.4	4.0

Deaths from respiratory tuberculosis by age, race, and sex.—Data on respiratory tuberculosis deaths by sex of the decedent are shown in table 4. A consistent difference between the two sex groups in the proportions of deaths in the home and in institutions has been noted in previous years [6] and is present in 1945 (table 4). Of all male deaths, 69.9 percent occurred in institutions while this was true of only 57.6 percent of the deaths among females. That this disparity is independent of race is indicated by the fact that the corresponding figures among whites were 69.9 and 56.0 percent, and among nonwhites are 69.8 and 61.0 percent. This difference seems to be attributable primarily to the relatively greater utilization of general hospitals by males. Only 19.2 percent of the deaths among females were

[6] Yerushalmy, J. and Moriyama, I. M., ibid., 512-513.

in general hospitals while for the males the figure was 29.8 percent. The corresponding percentages for whites and nonwhites, respectively, were 17.6 and 28.9, and 22.7 and 32.8. As figure 1 shows, there is little difference between the sex groups in the proportion of deaths in other types of institutions.

TABLE 4.—*Number and percent of deaths from respiratory tuberculosis in institutions and not in institutions by type of service and type of control by race and sex: United States, 1945*

Type of service and type of control	All races			White		Nonwhite	
	Total	Male	Female	Male	Female	Male	Female
	Number						
Total	48,879	30,697	18,182	23,556	12,406	7,141	5,776
Deaths not in institutions	16,959	9,248	7,711	7,092	5,460	2,156	2,251
Deaths in institutions	31,920	21,449	10,471	16,464	6,946	4,985	3,525
Type of service:							
General hospitals	12,644	9,155	3,489	6,816	2,180	2,339	1,309
Tuberculosis hospitals	14,239	9,186	5,053	7,111	3,274	2,075	1,779
Nervous and mental institutions	3,810	2,260	1,550	1,895	1,221	365	329
Other institutions	1,227	848	379	642	271	206	108
Type of control:							
Federal	3,505	3,284	221	2,411	29	873	192
State	7,741	4,466	3,275	3,420	2,239	1,046	1,036
County and city	15,024	10,148	4,876	7,589	2,981	2,559	1,895
Nonprofit	4,477	2,842	1,635	2,436	1,318	406	317
Proprietary and unknown	1,173	709	464	608	379	101	85
	Percent						
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Deaths not in institutions	34.7	30.1	42.4	30.1	44.0	30.2	39.0
Deaths in institutions	65.3	69.9	57.6	69.9	56.0	69.8	61.0
Type of service:							
General hospitals	25.9	29.8	19.2	28.9	17.6	32.8	22.7
Tuberculosis hospitals	29.1	29.9	27.8	30.2	26.4	29.1	30.8
Nervous and mental institutions	7.8	7.4	8.5	8.0	9.8	5.1	5.7
Other institutions	2.5	2.8	2.1	2.7	2.2	2.9	1.9
Type of control:							
Federal	7.2	10.7	1.2	10.2	0.2	12.2	3.3
State	15.8	14.5	18.0	14.5	18.0	14.6	17.9
County and city	30.7	33.1	26.8	32.2	24.0	35.8	32.8
Nonprofit	9.2	9.3	9.0	10.3	10.6	5.7	5.5
Proprietary and unknown	2.4	2.3	2.6	2.6	3.1	1.4	1.5

Analysis of the deaths in the home by age and race, shows that in any age group the relative number is about the same for each race group (table 5). In all race groups over 45 percent of the deaths among those 65 years and over were at home. This was the case in less than 30 percent of all deaths from respiratory tuberculosis for the youngest age group, under 15 years. In the three age groups spanning the years 15 to 64, the percent of deaths outside institutions varied between 31 and 38 percent. Of the deaths in institutions,the largest number in each race group at ages 15 to 44 was in tuberculosis

hospitals, while in the age group under 15 and 65 and over, the largest number of deaths in institutions was in general hospitals. The percent of deaths in nervous and mental hospitals shows for each race group, an increase with age except at ages 45 to 64 where there is a slight drop.

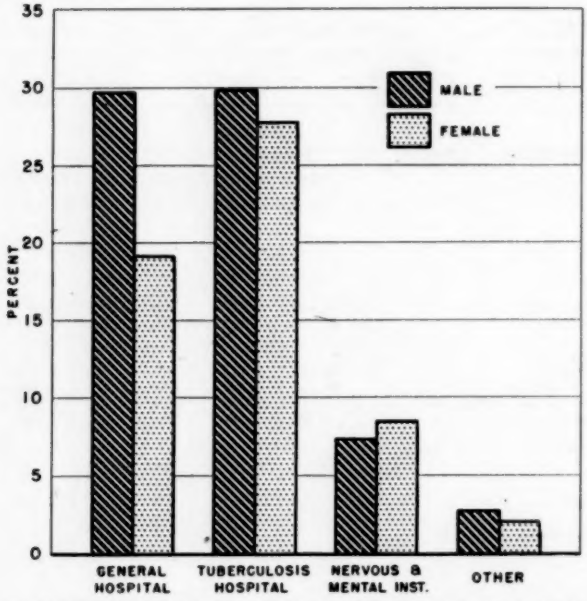

FIGURE 1.—Percent distribution of deaths from respiratory tuberculosis by sex in institutions by type of service of institution: United States, 1945.

For deaths from respiratory tuberculosis at the various ages the distribution between institutions and the home is much the same by race and sex (table 6) as it was by race alone (table 5). (The figures in table 6 are based on the 10 percent sample.) The highest percent of deaths in the home is found at the oldest ages, 65 years and above for both sexes, while the largest proportion of deaths in institutions is in the youngest age group. There is slight variation in the relative number of deaths in institutions in the age groups between 15 and 64. The number of deaths in institutions exceeded the number in homes in all age-race-sex groups, with the exception of the age group 65 years and over for both white and nonwhite females and for nonwhite males. The tuberculosis death rates at ages over 65 are decreasing less rapidly than those at other ages and an increasing proportion of tuberculosis deaths are among the elderly. If these facts indicate that this group is becoming increasingly important as a source of tuberculosis infection; efforts should be made to hospitalize, preferably in tuberculosis sanatoria, a greater proportion of the tuberculous over 65 years of age than is evidently being done at present.

TABLE 5.—*Number and percent of deaths from respiratory tuberculosis in institutions and not in institutions by type of service, by age and race: United States, 1945*

Race and type of institution	All ages	Under 15 years	15–24 years	25–44 years	45–64 years	65 years and over	Unknown
	Number						
All races:							
Total	48,879	1,018	6,213	17,943	16,620	7,039	46
Not in institutions	16,959	292	2,218	5,839	5,382	3,207	21
In institutions	31,920	726	3,995	12,104	11,238	3,832	25
General hospitals	12,644	410	1,370	4,258	4,874	1,720	12
Tuberculosis hospitals	14,239	193	2,124	5,969	4,769	1,179	5
Nervous and mental institutions	3,810	47	377	1,466	1,208	704	8
Other institutions	1,227	76	124	411	387	229	0
White:							
Total	35,962	518	3,256	12,128	13,673	6,364	23
Not in institutions	12,552	151	1,234	3,960	4,322	2,874	11
In institutions	23,410	367	2,022	8,168	9,351	3,490	12
General hospitals	8,996	226	638	2,707	3,892	1,527	6
Tuberculosis hospitals	10,385	57	1,065	4,105	4,058	1,095	5
Nervous and mental institutions	3,116	38	271	1,082	1,068	656	1
Other institutions	913	46	48	274	333	212	0
Nonwhite:							
Total	12,917	500	2,957	5,815	2,947	675	23
Not in institutions	4,407	141	984	1,879	1,060	333	10
In institutions	8,510	359	1,973	3,936	1,887	342	13
General hospitals	3,648	184	732	1,551	982	193	6
Tuberculosis hospitals	3,854	136	1,059	1,864	711	84	0
Nervous and mental institutions	694	9	106	384	140	48	7
Other institutions	314	30	76	137	54	17	0
	Percent						
All races:							
Total	100.0	100.0	100.0	100.0	100.0	100.0	.....
Not in institutions	34.7	28.7	35.7	32.5	32.4	45.6	.....
In institutions	65.3	71.3	64.3	67.5	67.6	54.4	.....
General hospitals	25.9	40.3	22.0	23.7	29.3	24.4	.....
Tuberculosis hospitals	29.1	18.9	34.2	33.3	28.7	16.7	.....
Nervous and mental institutions	7.8	4.6	6.1	8.2	7.3	10.0	.....
Other institutions	2.5	7.5	2.0	2.3	2.3	3.3	.....
White:							
Total	100.0	100.0	100.0	100.0	100.0	100.0	.....
Not in institutions	34.9	29.2	37.9	32.7	31.6	45.2	.....
In institutions	65.1	70.8	62.1	67.3	68.4	54.8	.....
General hospitals	25.0	43.6	19.6	22.3	28.5	24.0	.....
Tuberculosis hospitals	28.9	11.0	32.7	33.8	29.7	17.2	.....
Nervous and mental institutions	8.7	7.3	8.3	8.9	7.8	10.3	.....
Other institutions	2.5	8.9	1.5	2.3	2.4	3.3	.....
Nonwhite:							
Total	100.0	100.0	100.0	100.0	100.0	100.0	.....
Not in institutions	34.1	28.2	33.3	32.3	36.0	49.3	.....
In institutions	65.9	71.8	66.7	67.7	64.0	50.7	.....
General hospitals	28.2	36.8	24.7	26.7	33.3	28.6	.....
Tuberculosis hospitals	29.8	27.2	35.8	32.0	24.1	12.5	.....
Nervous and mental institutions	5.4	1.8	3.6	6.6	4.8	7.1	.....
Other institutions	2.5	6.0	2.6	2.4	1.8	2.5	.....

Length of stay in institutions before death from respiratory tuberculosis by age, race, and sex.—Although short lengths of stay in hospitals before death from respiratory tuberculosis may indicate that hospitalization was delayed until the disease was advanced, it should be kept in mind that there may have been previous hospitalization elsewhere. Deaths in general hospitals, to which patients of sanatoria were referred may have occurred after short periods and conceal long periods of stay in sanatoria. Long periods of hospitalization, i. e., over 1 year, may in-

TABLE 6.—*Percent of deaths from respiratory tuberculosis in institutions and not in institutions by age, race, and sex: Reporting area, 1945. (Based on a 10 percent sample of death certificates received in vital statistics offices of 43 States and the District of Columbia. Frequencies are given in appendix table 11)*

Race and sex	All ages	Under 15 years	15–24 years	25–44 years	45–64 years	65 years and over
All races, both sexes:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	34.7	17.4	33.7	33.9	31.2	47.8
In institutions	65.3	82.6	66.3	66.1	68.8	52.2
Male:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	30.4	19.4	29.7	28.3	28.8	40.8
In institutions	69.6	80.6	70.3	71.7	71.2	59.2
Female:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	42.6	15.8	36.4	41.4	41.3	62.3
In institutions	57.4	84.2	63.6	58.6	58.7	37.7
White, male:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	29.9	7.7	31.0	27.7	27.7	39.6
In institutions	70.1	92.3	69.0	72.3	72.3	60.4
White, female:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	43.9	15.8	37.4	41.4	41.5	61.4
In institutions	56.1	84.2	62.6	58.6	58.5	38.6
Nonwhite, male:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	32.3	27.8	28.3	29.9	33.8	52.4
In institutions	67.7	72.2	71.7	70.1	66.2	47.6
Nonwhite, female:						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Not in institutions	39.4	15.8	35.3	41.4	40.4	73.3
In institutions	60.6	84.2	64.7	58.6	59.6	26.7

dicate that cases of tuberculosis were found and institutionalized in the early stages of infection. However, from the fact that death terminated the period of hospitalization it would seem that in many instances the action was not taken in time to insure effective application of known methods of arresting the disease. Statistics on length of stay before death give no indication of the period during which the case was infectious and are therefore limited as indices of the effectiveness of control measures.

The percentage distribution of deaths from respiratory tuberculosis by length of stay in institutions is shown in tables 7 and 8. The number of respiratory tuberculosis deaths in the sample by length of stay appears in tables 12 and 13. In these tables of frequencies there are a number of deaths in each class for which length of stay in institutions was not reported. In 411 cases, or 14.7 percent of the total number of deaths in institutions, length of stay was not stated on the death certificate, or was unknown. There is no reason to believe that these unknown lengths of stay occurred disproportionately in any particular category of duration of hospitalization. There was a larger proportion (16.2 percent) of deaths in general hospitals following unknown length of stay than there were in tuberculosis hospitals (13.4

percent) or in nervous and mental institutions (10.3 percent). There appear to be no significant differences in age, race, or sex of persons who died after unreported periods of stay in institutions.

TABLE 7.—*Percent distribution of deaths from respiratory tuberculosis in institutions by length of stay, by age, race and sex: Reporting area, 1945. (Based on a 10-percent sample of death certificates received in vital statistics offices of 48 States and the District of Columbia)*

Age, race, and sex	Total	Length of stay in institutions					
		Less than 2 weeks	2 weeks to 2 months	3–5 months	6–11 months	1 year–1 year 11 months	2 years and over
All races, both sexes	100.0	20.6	29.1	12.1	11.0	10.0	17.2
Under 15 years	100.0	37.0	17.4	13.0	10.9	6.5	15.2
15–24 years	100.0	15.0	30.4	16.0	12.6	12.3	13.7
25–44 years	100.0	16.8	26.7	12.2	13.8	13.1	17.4
45–64 years	100.0	24.5	30.5	12.3	8.7	7.9	16.1
65 years and over	100.0	22.3	32.9	7.4	8.5	5.3	23.7
Male	100.0	22.2	31.0	11.8	10.5	9.2	15.2
Under 15 years	100.0	42.1	21.1	15.8	5.3	5.3	10.5
15–24 years	100.0	15.4	27.7	14.6	13.8	13.8	14.6
25–44 years	100.0	18.0	29.3	10.9	13.0	12.8	16.1
45–64 years	100.0	25.1	31.9	13.1	9.1	7.3	13.5
65 years and over	100.0	25.1	35.3	7.9	7.9	4.2	19.5
Female	100.0	16.8	24.9	12.8	12.1	11.8	21.7
Under 15 years	100.0	33.3	14.8	11.1	14.8	7.4	18.5
15–24 years	100.0	14.7	32.5	17.2	11.7	11.0	12.9
25–44 years	100.0	14.9	22.2	14.3	15.2	13.7	19.7
45–64 years	100.0	21.3	23.9	8.4	6.5	11.0	29.0
65 years and over	100.0	13.2	25.0	5.9	10.3	8.8	36.8
White	100.0	21.5	28.6	10.5	10.9	9.8	18.7
Under 15 years	100.0	41.7	29.2	8.3	0	8.3	12.5
15–24 years	100.0	14.5	28.3	14.5	12.6	11.9	18.2
25–44 years	100.0	19.3	23.0	10.3	14.3	13.3	19.7
45–64 years	100.0	24.1	31.5	10.8	9.0	8.0	16.5
65 years and over	100.0	21.1	33.3	7.7	8.8	5.4	23.8
Nonwhite	100.0	17.7	30.7	17.2	11.2	10.7	12.4
Under 15 years	100.0	31.8	4.5	18.2	22.7	4.5	18.2
15–24 years	100.0	15.7	32.8	17.9	12.7	12.7	8.2
25–44 years	100.0	11.0	35.3	16.5	12.5	12.5	12.2
45–64 years	100.0	26.1	25.5	19.6	7.2	7.2	14.4
65 years and over	100.0	36.4	27.3	4.5	4.5	4.5	22.7

Deaths following hospitalization periods ranging from 2 weeks to 2 months made up the largest proportion of the total for which length of stay was stated (table 7). In general, this is true of all of the age groups, as, among the various ages, there are only minor differences in length of stay in hospitals before death. A larger percentage of persons under 15 years died of respiratory tuberculosis within 2 weeks of hospitalization than did members of the older age groups. Also, the percentages of persons 45 years and over hospitalized 6 months or more, but less than 2 years, were less than 10 percent as compared with 12.3 percent or more for persons 15 to 45 years old.

Although the proportion of women dying of respiratory tuberculosis who are institutionalized is less than the proportion of men, the length of stay for women in institutions tends to be greater than for males. When the percentage distributions of each of the two sex groups as a whole are compared further, it is seen that more than half (53.2 percent) of the male deaths occur within 2 months of admission

or readmission, but for females only two-fifths of the deaths (41.7 percent) take place within this time. As figure 2 shows, there were larger percentages of male deaths than female deaths in the groups hospitalized less than 2 weeks and from 2 weeks to 2 months. In all age groups except ages 15–24 years the proportion of deaths in institutions after a stay of less than 2 months is higher for males than for females. All this suggests that a larger percentage of tuberculous males than female are hospitalized during the terminal phase, and that in view of this, the larger proportion of male than female deaths in institutions, shown earlier in this report (table 4), indicates a pattern of hospitalization which is only slightly more beneficial for males than for females.

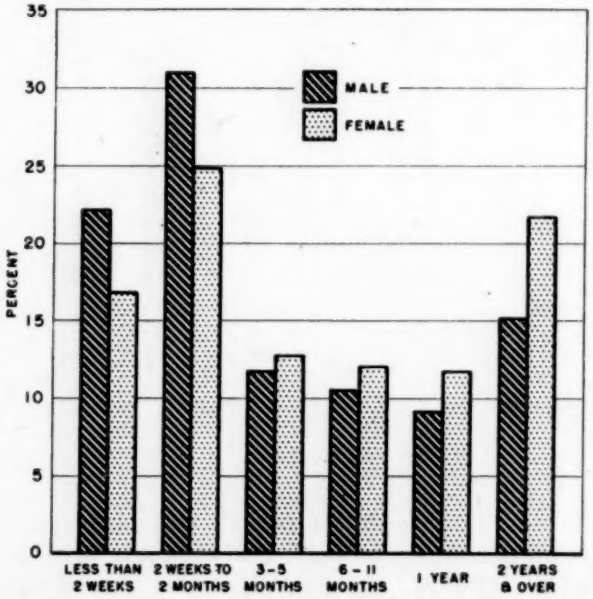

FIGURE 2.—Percent distribution of deaths from respiratory tuberculosis in institutions by length of stay and by sex: reporting area, 1945. (Based on a 10-percent sample of death certificates received in vital statistics offices of 43 States and the District of Columbia).

There appears to be close similarity between white and nonwhite groups in the percentage distribution of deaths in hospitals by length of stay. Although there may be differences at the youngest and the oldest age groups between white and nonwhite persons, the number of deaths in the sample at those ages is extremely small and should be interpreted with caution. (See table 12.)

The similarity between the race groups with regard to length of stay is in keeping with the fairly close agreement in the data for white and nonwhite deaths at various ages in institutions. Because the percent of deaths in general hospitals and in tuberculosis hospitals was about

the same for white and nonwhite groups (table 5) it would be expected that length of stay in institutions would be roughly the same for white and nonwhite.

Length of stay in institutions by type of service and type of control.—The median length of stay in institutions, regardless of type of service or type of control, was 3 months and 6 days. The relative distribution of respiratory tuberculosis deaths by type of service and control of institution by length of stay is shown in table 8. As would be expected, when length of stay is cross-tabulated by type of service, the largest proportion of persons dying in general hospitals had been in those hospitals for shorter periods than were for persons who died in other types of institutions. In general hospitals three-quarters of the deaths occurred within 2 months of admission. The period of stay most frequently reported for tuberculosis sanatoria was 2 weeks to 2 months in which 29.1 percent of deaths took place. However, each of the longer periods accounted for one-sixth to one-seventh of the deaths.

TABLE 8.—*Percent distribution of deaths from respiratory tuberculosis in institutions, by type of service and type of control, by length of stay: Reporting area, 1946. (Based on a 10 percent sample of death certificates received in vital statistics offices of 43 States and the District of Columbia)*

	Total	Length of stay in institutions					
		Less than 2 weeks	2 weeks to 2 months	3–5 months	6–11 months	1 year–1 year 11 months	2 years and over
Type of institution:							
Deaths in institutions	100.0	20.6	29.1	12.1	11.0	10.0	17.2
Type of service:							
General hospitals	100.0	37.8	37.2	9.0	6.9	5.5	3.6
Tuberculosis hospitals	100.0	9.7	29.1	17.7	16.5	14.0	13.1
Nervous and mental institutions	100.0	3.6	4.6	3.3	5.9	9.2	73.4
Other institutions	100.0	17.2	26.4	11.5	9.2	16.1	19.5
Type of control:							
Federal	100.0	17.3	29.9	15.3	17.7	7.5	12.2
State	100.0	8.4	17.6	9.2	12.5	11.2	41.1
County and city	100.0	24.1	35.2	13.7	8.9	10.3	7.8
Nonprofit	100.0	35.6	30.3	9.6	9.0	8.7	6.8
Proprietary and unknown	100.0	22.9	33.7	13.3	10.8	10.8	8.4

The median lengths of stay for the various types of service of institutions are shown below:

General hospitals	0.8 month.
Other institutions	4.7 months.
Tuberculosis hospitals	4.9 months.
Nervous and mental institutions	Over 5 years.

The short median length of stay in general hospitals before death from respiratory tuberculosis and the large proportions of such deaths occurring after a stay of less than 2 months (75.0 percent) have important implications for the evaluation of programs aimed at

hospitalizing the infectious cases of tuberculosis. An index of progress of such a program would not be simply an increase in the proportion of deaths in institutions but an increase in the proportion in tuberculosis hospitals, since, in many localities, hospitalization in a general hospital occurs too late in the course of the disease to fulfil the function of isolating the patient.

In the case of deaths from respiratory tuberculosis in nervous and mental institutions in particular, the figures do not reveal the exact period when tuberculosis was present. Although the proportion of respiratory tuberculosis deaths that occur in nervous and mental institutions is small in relation to the total annual number of tuberculosis deaths, the long stay in such institutions before death from this cause suggests that a sizeable reservoir of infection exists in institutions of this type. Moreover, conditions in institutions designed to serve diseases other than communicable ones are such as to favor the spread of tuberculosis unless early diagnosis and isolation are achieved.

When length of stay in institutions prior to death from respiratory tuberculosis is related to the type of control of institutions, it is seen that tuberculosis victims stay in State institutions nearly four times longer than in any other type of institution. Median lengths of stay are as follows:

Federal	3.5 months.
State	1 yr., 2.5 months.
County and city	2.8 months.
Nonprofit	1.1 months.
Proprietary and unknown	2.9 months.

Since the data in table 2 show that 92 percent of all respiratory tuberculosis deaths that occur in nervous and mental institutions, for which the median length of stay is over 5 years, are in State-controlled institutions, it is not surprising that median length of stay in State-administered institutions is more than 1 year. The relatively short median stay of persons dying of tuberculosis in city or county institutions is probably a reflection of the fact that two-fifths of the deaths in city-or-county-administered institutions are in general hospitals where fatal cases of respiratory tuberculosis stay an average of 25 days. Nearly three-fifths of respiratory tuberculosis deaths in county and city institutions occurred within 2 months of admission in contrast to one-quarter of the deaths in State-controlled institutions.

Deaths from respiratory tuberculosis in institutions by State.—The map (figure 3) shows the percentage of deaths from respiratory tuberculosis that occurred outside of hospitals or institutions by State of residence of the decedent. The percentage of deaths from respiratory tuberculosis that occurred outside of hospitals ranged from 10.5 for

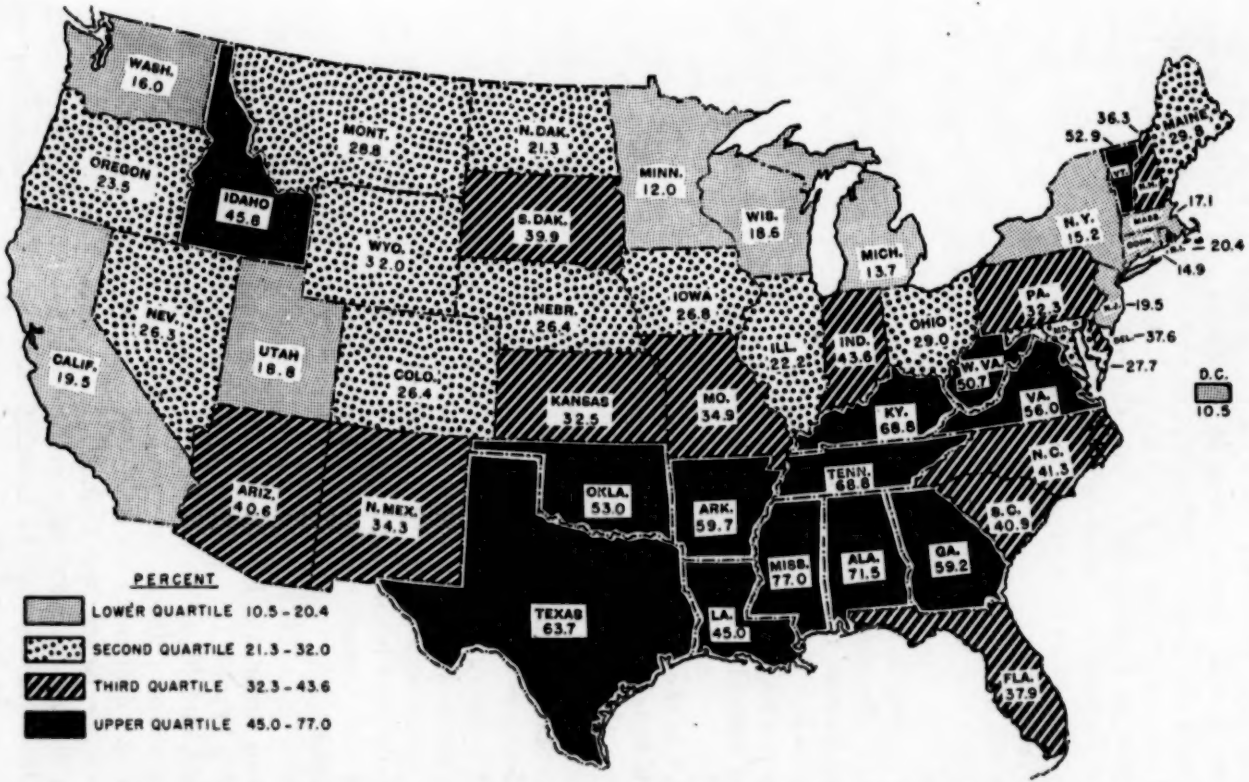

FIGURE 3.—Percent of deaths from respiratory tuberculosis occurring outside of institutions: Each State, 1945. (By place of residence.)

the District of Columbia and 11.9 percent for Minnesota to 77.0 for Mississippi. States for which the percentages are high, that is in the upper quartile, form a group in the South and Southeast plus two States in the North. States in the lower quartile are in the northern and far-western areas, and with one exception, were in the lower quartile for 1944. Many States showed decreases of 3 to 6 percent in the proportion of deaths outside of institutions in 1945 as compared with the 1943–44 average. Exceptions were Idaho, South Dakota, and Vermont.

In the States where the percentage of tuberculosis deaths in institutions is low, one might reason that this low proportion is a reflection of a general deficiency in hospitalizations (table 9). This is not true of Louisiana and Idaho where nearly one-half of the tuberculosis deaths take place in general hospitals. For the other States in the upper quartile the percentages of deaths in general hospitals were less than 14.0. These percentages may be compared with the percentage of respiratory tuberculosis deaths in general hospitals in States in the lower quartiles with percentages such as 38.9 for New York, 49.4 for California, 34.2 percent for Illinois. However, for several other States in the lower quartile the percentage of deaths in general hospitals is as low as the percentage in the upper quartile, but for the former, the proportion of deaths in tuberculosis hospitals is high.

As to the type of control of institutions in which deaths occur in some States in the lower quartile, relatively small numbers of deaths are found in State institutions, e. g., Alabama, Kentucky, Tennessee, but for other predominantly rural States, e. g., Arkansas, Mississippi, Oklahoma, and West Virginia, it appears that deaths in county or city institutions are relatively few. These figures may be indicative of inadequate institutional facilities of governmental ownership or of rules that exclude terminal cases from the limited official hospital facilities.

Differences between States in the proportion of white and nonwhite persons hospitalized before death from respiratory tuberculosis may be seen in table 10. In some of the States with large nonwhite populations, and for which the percentage of deaths in hospitals was low, the number of deaths among nonwhites in institutions was relatively high and deaths among whites in institutions relatively low. Such States are Kentucky, Tennessee, and Texas. In Northern States with sizable numbers of nonwhite deaths the ratios of nonwhite deaths in institutions to nonwhite deaths not in institutions were considerably larger than the corresponding ratios for white deaths. For instance, 93.7 percent of nonwhite deaths from tuberculosis in New York occurred in hospitals as compared with 82.5 percent of white deaths. For Pennsylvania the corresponding percentages are

TABLE 9.—*Number of deaths from respiratory tuberculosis in institutions and not in institutions, by type of service and type of control: United States and each State, 1945*

[By place of residence]

Area	Total	Deaths not in institutions	Deaths in institutions	Type of service				Type of control				
				General hospitals	Tuberculosis hospitals	Nervous and mental institutions	Other institutions	Federal	State	County and City	Nonprofit	Proprietary and unknown
United States	48,879	16,959	31,920	12,644	14,239	3,810	1,227	3,505	7,741	15,024	4,477	1,173
Alabama	1,121	801	320	78	168	57	17	55	63	123	67	12
Arizona	725	294	431	257	120	12	42	182	15	140	44	50
Arkansas	770	460	310	65	170	71	4	41	229	11	21	8
California	3,526	687	2,839	1,742	814	188	95	348	188	1,928	205	170
Colorado	386	102	284	173	90	8	13	52	8	45	156	23
Connecticut	612	91	521	126	312	76	7	21	356	54	90	------
Delaware	93	35	58	14	38	6	------	2	44	------	12	------
District of Columbia	485	51	434	278	126	18	12	88	------	320	22	4
Florida	700	265	435	217	156	36	26	59	72	247	41	16
Georgia	1,008	597	411	103	171	123	14	62	186	111	32	20
Idaho	72	33	39	33	2	2	2	9	3	3	20	4
Illinois	2,916	646	2,270	996	922	314	38	185	307	1,443	287	48
Indiana	1,013	442	571	187	282	77	25	53	136	305	64	13
Iowa	328	88	240	59	122	47	12	19	134	59	22	6
Kansas	314	102	212	76	101	31	4	34	138	13	21	6
Kentucky	1,472	1,012	460	138	232	74	16	86	76	221	53	24
Louisiana	1,030	464	566	411	85	61	9	71	413	16	48	18
Maine	225	67	158	35	85	34	4	8	114	5	26	5
Maryland	1,168	323	845	309	443	76	17	61	429	226	126	3
Massachusetts	1,551	265	1,286	394	665	176	51	111	310	714	141	10
Michigan	1,652	226	1,426	419	826	99	82	62	246	701	318	99
Minnesota	563	67	496	153	245	93	5	48	140	271	34	3
Mississippi	682	525	157	57	59	32	9	45	72	8	19	13
Missouri	1,342	469	873	392	385	67	29	94	184	482	96	17
Montana	156	45	111	51	50	7	3	18	52	18	20	3
Nebraska	163	43	120	54	39	24	3	15	64	28	10	3
Nevada	80	21	59	43	11	------	5	13	------	35	3	8
New Hampshire	91	33	58	17	22	16	3	6	24	1	12	15
New Jersey	1,649	321	1,328	270	830	204	24	55	139	975	149	10
New Mexico	341	117	224	104	104	11	5	124	38	7	48	7
New York	5,593	851	4,742	2,174	1,904	523	141	369	639	2,891	813	30
North Carolina	1,159	479	680	101	468	72	39	121	292	193	56	18
North Dakota	108	23	85	20	53	12	------	10	64	1	10	------
Ohio	2,394	695	1,699	645	655	212	187	117	226	971	152	233
Oklahoma	781	414	367	89	185	71	22	77	217	15	22	36
Oregon	272	64	208	63	115	22	8	22	74	57	39	16
Pennsylvania	3,577	1,157	2,420	1,067	927	311	115	149	753	866	620	32
Rhode Island	235	48	187	23	99	21	44	4	111	43	27	2
South Carolina	616	252	364	51	270	39	4	31	216	89	27	1
South Dakota	138	55	83	32	38	12	1	40	29	3	11	------
Tennessee	1,652	1,137	515	171	263	68	13	65	65	220	133	32
Texas	2,789	1,776	1,013	348	493	141	31	195	244	379	130	65
Utah	69	13	56	23	26	7	------	11	28	9	8	------
Vermont	102	54	48	14	26	8	------	3	31	------	14	------
Virginia	1,235	691	544	146	289	90	19	59	217	177	67	24
Washington	618	99	519	202	226	74	17	116	71	239	50	43
West Virginia	663	336	327	74	207	44	2	33	234	11	28	21
Wisconsin	619	115	504	143	311	42	8	51	44	347	60	2
Wyoming	25	8	17	7	9	1	------	5	6	3	3	------

TABLE 10.—*Number of deaths from respiratory tuberculosis in institutions and not in institutions, by race and sex: United States and each State, 1945. (By place of residence)*

Area	Both sexes		Male		Female		White				Nonwhite			
							Male		Female		Male		Female	
	In institutions	Not in institutions	In institutions	Not in institutions	In institutions	Not in institutions	In institutions	Not in institutions	In institutions	Not in institutions	In institutions	Not in institutions	In institutions	Not in institutions
United States	31,920	16,959	21,449	9,248	10,471	7,711	16,464	7,092	6,946	5,460	4,985	2,156	3,525	2,251
Alabama	320	801	196	404	124	397	94	202	42	165	102	202	82	232
Arizona	431	294	320	169	111	125	242	150	56	105	78	19	55	20
Arkansas	310	460	172	249	138	211	118	167	72	120	54	82	66	91
California	2,839	687	2,005	412	834	275	1,717	375	690	254	288	37	144	21
Colorado	284	102	204	56	80	46	191	52	73	43	13	4	7	3
Connecticut	521	91	373	62	148	29	330	59	130	26	43	3	18	3
Delaware	58	35	29	16	29	19	18	13	15	12	11	3	14	7
District of Columbia	434	51	297	22	137	29	118	13	35	17	179	9	102	12
Florida	435	265	303	168	132	97	155	83	51	37	148	85	81	60
Georgia	411	597	231	283	180	314	105	128	63	105	126	155	117	209
Idaho	39	33	29	25	10	8	24	22	7	6	5	3	3	2
Illinois	2,270	646	1,532	374	738	272	1,181	314	492	207	351	60	246	65
Indiana	571	442	359	232	212	210	304	198	172	188	55	34	40	22
Iowa	240	88	135	50	105	38	128	49	102	37	7	1	3	1
Kansas	212	102	133	51	79	51	119	45	68	46	14	6	11	5
Kentucky	460	1,012	310	498	150	514	223	424	103	443	87	74	47	71
Louisiana	566	464	359	282	207	182	190	138	68	52	169	144	139	130
Maine	138	67	88	38	70	29	87	38	70	29	1	-----	-----	-----
Maryland	845	323	529	189	316	134	269	112	146	76	260	77	170	58
Massachusetts	1,286	265	911	159	375	106	866	156	343	105	45	3	32	1
Michigan	1,426	226	979	127	447	99	767	117	282	89	212	10	165	10
Minnesota	496	67	313	37	183	30	299	34	167	26	14	3	16	4
Mississippi	157	525	118	260	39	265	56	95	16	53	62	165	23	212
Missouri	873	469	580	276	293	193	428	256	200	167	152	20	93	26
Montana	111	45	86	26	25	19	77	15	17	9	9	11	8	10
Nebraska	120	43	82	25	38	18	75	22	31	15	7	3	7	3
Nevada	59	21	53	15	6	6	44	9	6	2	9	6	-----	4
New Hampshire	58	33	45	20	13	13	45	20	13	13	-----	-----	-----	-----
New Jersey	1,328	321	890	192	438	129	719	169	295	113	171	23	143	16
New Mexico	224	117	156	55	68	62	115	49	37	54	41	6	31	8
New York	4,742	851	3,321	524	1,421	327	2,679	485	998	294	642	39	423	33
North Carolina	680	479	422	239	258	240	196	109	91	93	226	130	167	147
North Dakota	85	23	55	11	30	12	50	9	22	6	5	2	8	6
Ohio	1,699	695	1,096	399	603	296	819	354	405	252	277	45	198	44
Oklahoma	367	414	224	217	143	197	161	155	88	122	63	62	55	75
Oregon	208	64	145	40	63	24	135	40	53	21	10	-----	10	3
Pennsylvania	2,420	1,157	1,618	688	802	469	1,268	621	539	395	350	67	263	74
Rhode Island	187	48	133	28	54	20	125	25	46	20	8	3	8	-----
South Carolina	364	252	203	132	161	120	87	50	37	24	116	82	124	96
South Dakota	83	55	50	26	33	29	37	12	11	8	13	14	22	21
Tennessee	515	1,137	321	549	194	588	200	429	98	457	121	120	96	131
Texas	1,013	1,776	689	929	324	847	532	795	219	704	157	134	105	143
Utah	56	13	44	10	12	3	35	8	10	3	9	2	2	-----
Vermont	48	54	28	40	20	14	28	40	20	14	-----	-----	-----	-----
Virginia	544	691	344	362	200	329	183	192	84	182	161	170	116	147
Washington	519	99	363	51	156	48	314	41	131	41	49	10	25	7
West Virginia	327	336	216	160	111	176	175	136	83	161	41	24	28	15
Wisconsin	504	115	357	66	147	49	334	63	137	48	23	3	10	1
Wyoming	17	8	3	5	14	3	2	4	12	1	1	1	2	2

81.3 for nonwhites and 64.0 for whites. One possibility for the larger proportion of deaths in institutions for nonwhite persons may be that the nonwhites are less able to bear the cost of caring for tuberculosis cases at home. Another possibility is that diagnoses of tuberculosis may not be made in many respiratory tuberculosis deaths which occur outside of institutions.

SUMMARY

This paper presents data for 1945 on the number of deaths from respiratory tuberculosis in homes and in institutions for the United States and the individual States. Data are given from a ten percent sample of death certificates on the length of stay before death from respiratory tuberculosis in institutions.

In 1945 there were 16,959 deaths from respiratory tuberculosis in homes and 31,920 in institutions. Of all deaths from this cause, 29.1 percent occurred in tuberculosis hospitals, 25.9 percent in general hospitals, and 7.8 percent in institutions for nervous and mental disease. The largest part of the deaths in institutions took place in those administered by cities or counties, and State-controlled institutions accounted for the next largest portion.

As in previous years, a larger proportion of the deaths of men than of women occurred in institutions. For both white and nonwhite groups close to 70 percent of male deaths and approximately 60 percent of female deaths occurred in some type of hospital. Deaths in general hospitals accounted for a larger proportion of male deaths than of female deaths. The distribution on nonwhite deaths from respiratory tuberculosis in institutions is much the same as for white persons, except at the youngest age group.

More deaths of persons in the oldest age group occurred at home than did deaths for persons in the age groups 15 to 64 years. Noninstitutional deaths accounted for approximately one-third of the deaths of the 15-to-64-year-age group. Over half of the deaths among nonwhite males and white and nonwhite females over 65 years were not in institutions.

There was close agreement between white and nonwhite groups in length of stay in hospitals before death. The most frequently reported period of hospitalization before death was between 2 weeks and 2 months, except for females 45 years and over, who were hospitalized longer, and for nonwhites 65 years and over for which the largest group died in less than 2 weeks. Females in each age group were in hospitals for longer periods before death than men. Small differences

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in length of stay in hospitals were recorded between white and nonwhite persons dying of respiratory tuberculosis for most age groups. Median length of stay was 25 days in general hospitals, 4 months and 27 days in tuberculosis hospitals, and more than 5 years in nervous and mental institutions. Periods of hospitalization were longest, i. e., over 1 year, in State institutions, and shortest in city and county administered institutions.

States in the South showed the largest percentages of deaths outside of institutions. In several of these States the percentage of deaths among nonwhites in hospitals was larger than that for white deaths. States with a high percentage of deaths in homes are of two types: those that show relatively few respiratory tuberculosis deaths in general hospitals, and those that show only a small proportion of respiratory tuberculosis deaths in tuberculosis hospitals. Many States with a low percentage of deaths in the home show the highest proportion of deaths in tuberculosis hospitals.

TABLE 11.—*Number of deaths from respiratory tuberculosis in institutions and not in institutions by age, race, and sex: Reporting area, 1945*

[Based on a 10 percent sample of death certificates received in vital statistics offices of 43 States and the District of Columbia]

Race and sex	All ages	Under 15 years	15–24 years	25–44 years	45–64 years	65 years and over	Unknown
All races, both sexes:							
Total	4,291	69	525	1,539	1,522	630	6
Not in institutions	1,488	12	177	521	475	301	2
In institutions	2,803	57	348	1,018	1,047	329	4
Male:							
Total	2,792	31	212	889	1,229	426	5
Not in institutions	850	6	63	252	354	174	1
In institutions	1,942	25	149	637	875	252	4
Female:							
Total	1,499	38	313	650	293	204	1
Not in institutions	638	6	114	269	121	127	1
In institutions	861	32	199	381	172	77	0
White male:							
Total	2,132	13	113	611	1,007	384	4
Not in institutions	637	1	35	169	279	152	1
In institutions	1,495	12	78	442	728	232	3
White female:							
Total	1,047	19	163	440	236	189	0
Not in institutions	460	3	61	182	98	116	0
In institutions	587	16	102	258	138	73	0
Nonwhite male:							
Total	660	18	99	278	222	42	1
Not in institutions	213	5	28	83	75	22	0
In institutions	447	13	71	195	147	20	1
Nonwhite female:							
Total	452	19	150	210	57	15	1
Not in institutions	178	3	53	87	23	11	1
In institutions	274	16	97	123	34	4	0

TABLE 12.—*Number of deaths from respiratory tuberculosis in institutions by length of stay and deaths not in institutions, by age, race, and sex: Reporting area, 1945. (Based on a 10 percent sample of death certificates received in vital statistics offices of 43 States and the District of Columbia)*

Age, race, and sex	Deaths in sample	Length of stay in institutions								Not in institutions
		Total	Less than 2 weeks	2 weeks to 2 months	3–5 months	6–11 months	1 year–1 year 11 months	2 years and over	Unknown	
All races, both sexes	4,291	2,803	492	697	290	263	239	411	411	1,488
Under 15 years	69	57	17	8	6	5	3	7	11	12
15–24 years	525	348	44	89	47	37	36	40	55	177
25–44 years	1,539	1,018	144	228	104	118	112	149	163	521
45–64 years	1,522	1,047	223	278	112	79	72	147	136	475
65 years and over	630	329	63	93	21	24	15	67	46	301
Not stated	6	4	1	1			1	1		2
Male	2,792	1,942	370	516	197	175	153	253	278	850
Under 15 years	31	25	8	4	3	1	1	2	6	6
15–24 years	212	149	20	36	19	18	18	19	19	63
25–44 years	889	637	97	158	59	70	69	87	97	252
45–64 years	1,229	875	190	241	99	69	55	102	119	354
65 years and over	426	252	54	76	17	17	9	42	37	174
Not stated	5	4	1	1			1	1		1
Female	1,499	861	122	181	93	88	86	158	133	638
Under 15 years	38	32	9	4	3	4	2	5	5	6
15–24 years	313	199	24	53	28	19	18	21	36	114
25–44 years	650	381	47	70	45	48	43	62	66	269
45–64 years	293	172	33	37	13	10	17	45	17	121
65 years and over	204	77	9	17	4	7	6	25	9	127
Not stated	1									1
White	3,179	2,082	388	517	189	197	176	338	277	1,097
Under 15 years	32	28	10	7	2		2	3	4	4
15–24 years	276	180	23	45	23	20	19	29	21	96
25–44 years	1,051	700	116	138	62	86	80	118	100	351
45–64 years	1,243	866	183	239	82	68	61	125	108	377
65 years and over	573	305	55	87	20	23	14	62	44	268
Not stated	4	3	1	1				1		1
Nonwhite	1,112	721	104	180	101	66	63	73	134	391
Under 15 years	37	29	7	1	4	5	1	4	7	8
15–24 years	249	168	21	44	24	17	17	11	34	81
25–44 years	488	318	28	90	42	32	32	31	63	170
45–64 years	279	181	40	39	30	11	11	22	28	98
65 years and over	57	24	8	6	1	1	1	5	2	33
Not stated	2	1					1			1

TABLE 13.—*Number of deaths from respiratory tuberculosis in institutions by length of stay and by type of service and type of control and deaths not in institutions: Reporting area, 1945. (Based on a 10 percent sample of death certificates received in vital statistics offices of 43 States and the District of Columbia)*

	Deaths in sample	Total	Length of stay in institutions						
			Less than 2 weeks	2 weeks to 2 months	3–5 months	6–11 months	1 year–1 year 11 mos.	2 years and over	Unknown
Type of institution:									
Deaths not in institutions	1,488								
Deaths in institutions	2,803	2,803	492	697	290	263	239	411	411
Type of service:									
General hospital	1,155	1,155	366	360	87	67	53	35	187
Tuberculosis hospital	1,191	1,191	100	300	183	170	144	135	159
Nervous and mental inst.	340	340	11	14	10	18	28	224	35
Other institutions	117	117	15	23	10	8	14	17	30
Type of control:									
Federal	325	325	51	88	45	52	22	36	31
State	721	721	54	113	59	80	72	264	79
County and city	1,235	1,235	253	370	144	93	108	82	185
Nonprofit	410	410	115	98	31	29	28	22	87
Proprietary and unknown	112	112	19	28	11	9	9	7	29

ANNOUNCEMENT

RECORD SYSTEM MANUAL

The Tuberculosis Control Division announces the publication of a training manual entitled, "State Central Case Record Systems and Local Case Registers for Tuberculosis." This manual, which is now available upon request to interested persons in the medical and public health professions, was prepared in response to requests from State and local health departments, so that the establishment of efficient record systems may be facilitated.

The record system is the chief tool in the follow-up of discovered cases and the effective utilization of such systems makes mass case finding an epidemiological instrument of high value. Moreover, the record system correlates all aspects of tuberculosis control. The manual is not presented as definitive and universally applicable in all local or State situations. The Tuberculosis Control Division offers direct assistance and consultation in the installation of record systems and registers that will be appropriate to local needs.

Simplicity and flexibility are necessary characteristics of the summary record pattern presented in this manual. Interchange of information is the most difficult problem encountered in record work. All forms should be simple and immediately comprehensible. The use of punch card or other codes tends to discourage replies and destroys the effectiveness of the system.

The Division believes it important to point out that when a basic system is operating efficiently for the most significant cases, it may be then expanded to include cases of lesser importance and may be elaborated to employ punch card tabulations which will have value for the tuberculosis administrator.

DEATHS DURING WEEK ENDED AUG. 9, 1947

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Aug. 9, 1947	Corresponding week, 1946
Data for 93 large cities of the United States:		
Total deaths	8,877	7,866
Median for 3 prior years	7,919	
Total deaths, first 32 weeks of year	301,332	297,384
Deaths under 1 year of age	702	668
Median for 3 prior years	590	
Deaths under 1 year of age, first 32 weeks of year	24,008	20,014
Data from industrial insurance companies:		
Policies in force	67,228,627	67,249,618
Number of death claims	10,661	10,499
Death claims per 1,000 policies in force, annual rate	8.3	8.1
Death claims per 1,000 policies, first 32 weeks of year, annual rate	9.6	9.9

INCIDENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 16, 1947

Summary

The reported incidence of poliomyelitis increased from 279 cases for the preceding week to 412 for the current week, as compared with 747 for the 5-year (1942–46) median, and 1,816 for the corresponding week last year. The latter figure proved to be the peak of weekly incidence for 1946. The 13 States reporting currently 12 or more cases, all showing increases, are as follows (last week's figures in parentheses): Massachusetts 14 (11), New York 30 (14), Pennsylvania 19 (18), Ohio 22 (18), Illinois 54 (27), Michigan 25 (14), Minnesota 13 (4), Iowa 15 (8), Delaware 12 (5), Virginia 12 (4), Idaho 18 (9), Washington State 15 (8), California 28 (19). States having the highest incidence rates per 100,000 estimated population during the past 3 weeks (not on annual basis) are as follows: Idaho, 6.8; Delaware, 6.6; Rhode Island, 4.6; Nebraska, 3.1; North Dakota, 2.8; Wyoming, 1.5; Montana, 1.5; Illinois, 1.2; Washington, 1.2; Iowa, 1.1. The incidence rate for the country as a whole for this 3-week period is 0.6.

Of the total of 27 cases of Rocky Mountain spotted fever reported during the week, 21 occurred in the South Atlantic and East South Central areas, 3 in Illinois and 1 each in New York, Arkansas, and Utah. The total for the year to date is 398, as compared with 416 for the same period last year and a 5-year median of 365. No case of smallpox was reported during the week (3 cases were reported for the corresponding week last year).

Other current figures above the respective 5-year medians are as follows (median figures in parentheses); Amebic dysentery 79 (41), measles 814 (804), tularemia 28 (11), undulant fever 117 (83, 2-year average), and whooping cough 3,327 (2,129).

Deaths recorded during the week in 92 large cities of the United States totaled 8,801, as compared with 8,851 in the same cities last week, 7,673 and 7,642, respectively, for the corresponding weeks of 1946 and 1945, and a 3-year (1944–46) median of 7,634. The cumulative total for these cities is 309,127, as compared with 304,038 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended Aug. 16, 1947, and comparison with corresponding week of 1946 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1942–46	Week ended—		Median 1942–46	Week ended—		Median 1942–46	Week ended—		Median 1942–46
	Aug. 16, 1947	Aug. 17, 1946		Aug. 16, 1947	Aug. 17, 1946		Aug. 16, 1947	Aug. 17, 1946		Aug. 16, 1947	Aug. 17, 1946	
NEW ENGLAND												
Maine	0	8	0				4	7	8	0	0	0
New Hampshire	0	0	0					21	3	0	1	1
Vermont	0	0	0				6	25	11	0	0	0
Massachusetts	8	2	1				27	106	55	0	2	2
Rhode Island	0	0	0				1	6	4	1	0	0
Connecticut	1	1	0		1		13	15	10	2	1	1
MIDDLE ATLANTIC												
New York	9	14	5	(1)	[1] 4	[1] 2	102	114	67	9	6	11
New Jersey	0	5	2	1	1	1	35	60	36	2	1	2
Pennsylvania	9	3	3	(2)	[2] 1	[2] 1	24	72	35	5	2	3
EAST NORTH CENTRAL												
Ohio	3	3	5	1		1	38	161	16	3	5	5
Indiana	1	2	2			3	10		5	1	0	1
Illinois	2	4	6		1	1	53	26	26	3	1	7
Michigan [3]	4	0	4	1		1	34	25	36	1	1	4
Wisconsin	0	0	2	5	10	10	111	71	78	3	7	3
WEST NORTH CENTRAL												
Minnesota	2	1	4				21	12	8	1	1	1
Iowa	0	0	0				15	7	3	0	0	1
Missouri	2	8	1	1	1	1	16	3	7	2	0	1
North Dakota	0	5	4				13	3	3	1	0	0
South Dakota	0	1	0				4	2	2	0	0	0
Nebraska	0	1	1			1	2	4	4	0	0	0
Kansas	1	10	2	1	3		4	6	6	0	1	1
SOUTH ATLANTIC												
Delaware	0	0	0				2			0	0	0
Maryland [3]	2	6	5			1	6	21	9	0	1	3
District of Columbia	0	0	0					4	4	0	3	2
Virginia	2	5	5	80	117	54	26	22	13	2	3	3
West Virginia	1	3	2	14	1	1	24		2	2	0	0
North Carolina	7	14	14				1	7	7	1	1	1
South Carolina	9	3	14	92	138	104	11	5	5	0	0	0
Georgia	4	3	11	1		7	9	7	3	0	1	1
Florida	5	7	3	4	3	3	13	4	3	0	2	3
EAST SOUTH CENTRAL												
Kentucky	0	2	3					1	3	0	1	1
Tennessee	3	2	2	7	3	3	9	9	7	1	1	2
Alabama	1	7	7	8	18	17	3	5	5	2	1	1
Mississippi [3]	9	4	8							0	0	1
WEST SOUTH CENTRAL												
Arkansas	1	9	4	2		5	10	8	2	1	3	1
Louisiana	2	3	4		3	4	5	1	3	1	1	1
Oklahoma	6	4	3	39	7	11	2	3	2	1	2	1
Texas	15	16	25	131	264	221	38	64	43	1	2	2
MOUNTAIN												
Montana	0	1	1	2	3	1	10	32	11	2	0	0
Idaho	0	0	0	2			3		7	1	0	0
Wyoming	0	0	0				1	4	4	0	0	0
Colorado	1	4	3	9	2	11	2	13	11	3	1	1
New Mexico	0	3	1		1		1	6		0	0	0
Arizona	1	4	2	7	15	20	2	6	6	0	0	0
Utah [3]	0	0	0				4	9	23	0	0	0
Nevada	0	0	0							0	0	0
PACIFIC												
Washington	2	16	3				13	9	19	0	0	2
Oregon	1	1	1	1	5	1	11	12	13	1	0	2
California	14	21	11	3	3	9	75	83	110	2	7	8
Total	128	206	206	412	605	506	814	1,081	804	55	59	79
33 weeks	7,088	9,902	7,426	302,958	191,822	81,667	184,128	638,642	537,131	2,482	4,457	6,176
Seasonal low week [4]	(27th) July 5–11			(30th) July 26–Aug. 1			(35th) Aug. 30–Sept. 5			(37th) Sept. 13–19		
Total since low	791	1,274	1,067	1,445	1,625	1,594	207,015	664,766	575,144	3,454	5,961	8,628

[1] New York City only. [2] Philadelphia only. [3] Period ended earlier than Saturday.
[4] Dates between which the approximate low week ends. The specific date will vary from year to year.

Telegraphic morbidity reports from State health officers for the week ended Aug. 16, 1947, and comparison with corresponding week of 1946 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1942-46	Week ended—		Median 1942-46	Week ended—		Median 1942-46	Week ended—		Median 1942-46
	Aug. 16, 1947	Aug. 17, 1946		Aug. 16, 1947	Aug. 17, 1946		Aug. 16, 1947	Aug. 17, 1946		Aug. 16, 1947 [3]	Aug. 17, 1946	
NEW ENGLAND												
Maine	2	3	0	9	6	4	0	0	0	3	1	0
New Hampshire	1	16	1	1	2	2	0	0	0	0	0	0
Vermont	1	3	2	0	0	0	0	0	0	0	0	0
Massachusetts	14	14	14	13	26	46	0	0	0	4	3	3
Rhode Island	11	7	0	3	2	2	0	0	0	0	1	0
Connecticut	9	4	13	1	4	4	0	0	0	1	0	1
MIDDLE ATLANTIC												
New York	30	57	57	47	59	59	0	0	0	6	8	8
New Jersey	11	19	19	14	17	14	0	0	0	2	5	6
Pennsylvania	19	19	19	25	25	32	0	0	0	13	7	6
EAST NORTH CENTRAL												
Ohio	22	48	15	21	64	52	0	2	0	2	6	7
Indiana	5	18	16	13	17	13	0	0	0	8	4	2
Illinois	54	204	77	18	22	26	0	0	0	2	4	4
Michigan [3]	25	70	12	27	22	26	0	0	0	3	7	4
Wisconsin	2	48	3	10	26	32	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	13	366	14	8	9	11	0	0	0	0	0	0
Iowa	15	40	8	15	6	9	0	0	0	1	1	1
Missouri	1	105	10	3	3	7	0	0	0	9	1	1
North Dakota	5	48	2	1	1	2	0	0	0	0	0	0
South Dakota	0	28	0	0	1	2	0	0	0	0	3	0
Nebraska	10	35	5	7	5	2	0	0	0	0	1	0
Kansas	5	73	7	5	7	19	0	0	0	1	4	4
SOUTH ATLANTIC												
Delaware	12	0	2	2	2	1	0	0	0	1	2	1
Maryland [3]	6	6	6	4	2	8	0	0	0	1	3	1
District of Columbia	2	2	2	6	4	4	0	0	0	0	1	0
Virginia	12	9	9	6	18	13	0	0	0	3	3	6
West Virginia	9	9	6	2	16	18	0	0	0	[6]3	4	3
North Carolina	7	6	6	3	14	26	0	0	0	0	0	1
South Carolina	1	1	1	6	3	5	0	0	0	8	2	4
Georgia	1	4	3	6	14	14	0	0	0	9	2	10
Florida	2	18	3	4	4	2	0	0	0	1	2	4
EAST SOUTH CENTRAL												
Kentucky	2	6	10	7	3	6	0	0	0	5	3	7
Tennessee	0	10	5	5	12	9	0	0	0	5	5	5
Alabama	1	23	7	1	7	8	0	0	0	0	3	3
Mississippi [3]	1	31	3	3	9	9	0	0	0	3	3	5
WEST SOUTH CENTRAL												
Arkansas	9	25	6	1	0	5	0	0	0	7	3	5
Louisiana	0	22	6	0	2	3	0	0	0	4	7	7
Oklahoma	7	35	18	3	4	4	0	0	0	2	3	3
Texas	6	49	49	18	16	22	0	0	0	16	20	18
MOUNTAIN												
Montana	4	7	0	5	4	4	0	0	0	0	2	0
Idaho	[6]18	3	1	3	1	2	0	1	0	0	2	0
Wyoming	3	11	0	1	0	2	0	0	0	0	0	0
Colorado	5	82	7	2	13	11	0	0	0	0	1	1
New Mexico	0	16	1	1	0	0	0	0	0	2	2	1
Arizona	1	16	3	0	1	2	0	0	0	0	1	1
Utah [3]	0	9	8	2	5	5	0	0	0	0	0	0
Nevada	0	0	0	0	1	0	0	0	0	0	0	0
PACIFIC												
Washington	15	27	20	9	9	10	0	0	0	0	1	1
Oregon	5	12	11	6	6	6	0	0	0	1	5	2
California	28	152	25	30	50	52	0	0	0	5	4	4
Total	412	1,816	747	377	544	650	0	3	2	131	140	170
33 weeks	[6]2,645	8,841	4,308	62,480	86,839	97,729	145	278	300	[6]2,242	2,519	3,257
Seasonal low week [4]	(11th) Mar. 15-21			(32d) Aug. 9-15			(35th) Aug. 30-Sept. 5			(11th) Mar. 15-21		
Total since low	[6]2,033	8,374	3,911	377	544	650	199	354	417	[6]1,757	2,044	2,441

[3] Period ended earlier than Saturday.

[4] Dates between which the approximate low week ends. The specific date will vary from year to year.

[5] Including paratyphoid fever reported separately as follows: Maine, 2; Massachusetts, 4 (salmonella infection); Connecticut, 1; Virginia, 2; Georgia, 4; Kentucky, 1; Oklahoma, 1; Texas 3; California 1.

[6] Corrections: Poliomyelitis, Idaho week ended July 12, 1 case (instead of 2). Typhoid fever, West Virginia, week ended July 26, 2 cases (instead of 5). These cases deducted from cumulative totals.

Telegraphic morbidity reports from State health officers for the week ended Aug. 16, 1947, and comparison with corresponding week of 1946 and 5-year median—Con.

Division and State	Whooping cough			Week ended August 16, 1947							
	Week ended—		Median 1942–46	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	Aug. 16, 1947	Aug. 17, 1946		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	18	9	14								1
New Hampshire	3	7									
Vermont	35	7	12								1
Massachusetts	117	101	94	1	4				2		4
Rhode Island	20	21	12								
Connecticut	22	35	35								2
MIDDLE ATLANTIC											
New York	223	146	241	11	1		1	1			5
New Jersey	206	135	135		1		1				
Pennsylvania	214	126	156								4
EAST NORTH CENTRAL											
Ohio	309	178	158			1					4
Indiana	61	31	31		1						1
Illinois	169	181	181	5			1	3			9
Michigan [3]	286	184	184	5	1		1				6
Wisconsin	181	216	216								4
WEST NORTH CENTRAL											
Minnesota	110	15	44	1					1		5
Iowa	50	26	26								12
Missouri	43	18	18						8		5
North Dakota	8		3				3				1
South Dakota	4	1	2				1				2
Nebraska	20	3	3								1
Kansas	31	29	24								3
SOUTH ATLANTIC											
Delaware	6	3	3					1			
Maryland [3]	87	18	56					4			
District of Columbia	21	9	9								
Virginia	89	63	40			138		1	1		
West Virginia	35	41	27					2			
North Carolina	29	91	93	1				6	1	2	1
South Carolina	64	50	55	3	12						1
Georgia	50	3	9						2	16	2
Florida	25	22	18							9	2
EAST SOUTH CENTRAL											
Kentucky	17	24	29				1	6			
Tennessee	39	35	35			1	4	1		1	2
Alabama	10	7	14	1						3	5
Mississippi [3]	5			2					1	2	
WEST SOUTH CENTRAL											
Arkansas	13	10	10	9		24		1	7		1
Louisiana	7	2	5	[7]19						6	
Oklahoma	24	3	11		1	1			1		2
Texas	384	139	139	24	246	41				25	13
MOUNTAIN											
Montana	8	1	9								
Idaho	6	7	4								
Wyoming	6	4	3	1		1					
Colorado	84	22	25				1				3
New Mexico	11	6	6		1	3					
Arizona	18	4	7			11					
Utah [3]	13	11	18					1			2
Nevada											
PACIFIC											
Washington	27	16	22								
Oregon	15	21	21	2							
California	165	48	125	3	2		5		4	4	10
Total	3,388	2,129	2,129	79	270	221	19	27	28	68	117
Same week, 1946	2,129			50	247	201	26	28	17	108	85
Median, 1942–46	2,129			41	387	315	22	18	11	149	[8]83
33 weeks: 1947	102,868			[7]1,964	10,433	6,535	265	398	990	1,315	3,845
1946	64,543			1,481	11,640	4,536	387	416	629	2,086	3,215
Median, 1942–46	84,194			1,183	11,640	4,626	372	365	590	2,202	[8]3,163

[3] Period ended earlier than Saturday.

[7] Delayed report: Amebic dysentery, Louisiana, March through July, 56 cases. Included in cumulative totals. [8] 2-year average, 1945–46. *Anthrax:* New Jersey 1 case. *Leprosy:* Texas 2 cases.

Alaska, week ended August 16, 1947: Pneumonia 1, typhoid fever 2, septic sore throat 1.

Territory of Hawaii, week ended August 16, 1947: Diphtheria 1, bacillary dysentery 2, influenza 4, leprosy 1, measles 1, endemic typhus fever 1, whooping cough 17.

WEEKLY REPORTS FROM CITIES [1]

City reports for week ended Aug. 9, 1947

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	-----	0	-----	0	1	0	2	0	0	-----
New Hampshire:												
Concord	0	0	-----	0	-----	0	0	0	0	0	0	-----
Massachusetts:												
Boston	1	0	-----	0	2	0	0	4	4	0	1	28
Fall River	0	0	-----	0	5	0	1	3	1	0	0	1
Springfield	0	0	-----	0	1	0	0	0	0	0	0	-----
Worcester	0	0	-----	0	1	0	1	0	0	0	1	8
Rhode Island:												
Providence	0	0	-----	0	1	1	2	7	0	0	1	32
Connecticut:												
Bridgeport	0	0	-----	0	2	0	0	0	0	0	0	1
Hartford	0	0	-----	0	3	0	0	0	1	0	0	2
New Haven	0	0	-----	0	1	0	1	2	0	0	0	20
MIDDLE ATLANTIC												
New York:												
Buffalo	1	0	-----	0	-----	0	7	0	2	0	0	2
New York	2	5	4	1	57	3	47	5	14	0	4	76
Rochester	0	0	-----	0	1	1	1	2	3	0	0	2
Syracuse	0	0	-----	0	-----	0	0	0	5	0	0	20
New Jersey:												
Camden	0	0	-----	0	-----	0	0	0	1	0	0	-----
Newark	0	0	-----	0	7	0	0	0	3	0	0	34
Trenton	0	0	-----	0	-----	0	0	0	0	0	0	11
Pennsylvania:												
Philadelphia	3	1	-----	0	8	0	0	4	2	0	3	76
Pittsburgh	0	0	-----	0	1	0	6	0	2	0	0	16
Reading	0	0	-----	0	-----	0	1	0	1	0	0	-----
EAST NORTH CENTRAL												
Ohio:												
Cleveland	1	0	-----	0	7	0	1	2	5	0	0	143
Columbus	2	0	-----	0	6	0	1	0	0	0	0	25
Indiana:												
Fort Wayne	0	0	-----	0	-----	0	2	1	0	0	0	4
Indianapolis	0	0	-----	0	4	0	2	0	1	0	0	1
South Bend	0	0	-----	0	1	0	0	2	0	0	1	-----
Terre Haute	0	0	-----	0	-----	0	1	0	0	0	1	3
Illinois:												
Chicago	0	0	-----	0	22	1	22	18	7	0	0	39
Springfield	0	0	-----	0	-----	0	4	0	1	0	0	3
Michigan:												
Detroit	3	0	-----	0	1	0	4	6	9	0	0	75
Flint	0	0	-----	0	-----	0	0	2	1	0	0	-----
Grand Rapids	0	0	-----	0	11	0	1	0	1	0	0	20
Wisconsin:												
Kenosha	0	0	-----	0	7	1	0	0	0	0	0	7
Milwaukee	0	0	-----	0	10	0	0	1	1	0	0	32
Racine	0	0	-----	0	4	0	0	1	2	0	0	3
Superior	0	0	-----	0	-----	0	0	0	1	0	0	2
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	-----	0	-----	0	0	0	1	0	0	41
Minneapolis	0	0	-----	0	11	0	2	1	3	0	0	20
St. Paul	0	0	-----	0	8	0	5	0	0	0	0	112
Missouri:												
Kansas City	0	0	-----	0	-----	0	10	0	1	0	1	11
St. Joseph	0	0	-----	0	-----	0	0	0	0	0	1	-----
St. Louis	0	0	-----	0	9	0	8	2	1	0	3	30

[1] In some instances the figures include nonresident cases.

City reports for week ended August 9, 1947—Continued

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	3	0	0	0	0	0	0	------
Nebraska:												
Omaha	0	0	------	0	1	0	2	4	0	0	0	3
Kansas:												
Topeka	0	0	------	0	------	0	0	0	0	0	0	------
Wichita	0	0	------	0	3	0	2	0	0	0	0	10
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	------	0	3	5	0	0	0	8
Maryland:												
Baltimore	0	0	------	0	------	0	4	0	5	0	0	76
Cumberland	1	0	------	0	------	0	0	0	1	0	0	2
Frederick	0	0	------	0	------	0	1	0	0	0	0	------
District of Columbia:												
Washington	0	0	------	0	2	0	5	0	3	0	0	8
Virginia:												
Lynchburg	0	0	------	0	------	0	1	0	0	0	0	1
Richmond	0	0	------	0	2	0	1	2	1	0	0	3
Roanoke	1	0	------	0	------	0	0	0	0	0	0	------
West Virginia:												
Charleston	0	0	------	0	1	1	0	0	0	0	0	1
Wheeling	0	0	------	0	------	0	1	0	0	0	0	2
North Carolina:												
Raleigh	0	0	------	0	1	0	1	0	0	0	0	------
Wilmington	0	0	------	0	------	0	0	0	0	0	0	3
Winston-Salem	0	0	------	0	1	0	0	0	0	0	0	5
South Carolina:												
Charleston	0	0	4	0	------	0	1	0	0	0	5	0
Georgia:												
Atlanta	0	0	------	0	------	0	1	0	0	0	0	2
Brunswick	0	0	------	0	------	0	0	0	0	0	0	------
Savannah	0	0	------	0	------	0	0	0	0	0	0	59
Florida:												
Tampa	0	0	------	0	------	0	2	0	0	0	0	2
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	1	0	8	2	2	0	0	7
Nashville	0	0	------	1	------	0	2	0	0	0	0	7
Alabama:												
Birmingham	0	0	------	0	1	0	0	1	0	0	0	1
Mobile	0	0	------	0	------	0	0	0	0	0	1	1
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	1	0	------	0	0	0	0	0	0	5
Louisiana:												
New Orleans	0	0	------	0	3	1	7	0	0	0	2	3
Shreveport	0	0	------	0	------	0	5	0	0	0	0	------
Oklahoma:												
Oklahoma City	0	0	------	0	------	0	2	0	0	0	0	1
Texas:												
Dallas	1	0	------	0	2	0	2	0	0	0	0	11
Galveston	0	0	------	0	------	0	0	0	0	0	0	------
Houston	0	0	------	0	------	0	2	0	1	0	0	6
San Antonio	0	0	------	0	------	0	7	0	2	0	0	2
MOUNTAIN												
Montana:												
Billings	0	0	------	0	1	0	0	0	0	0	0	------
Great Falls	0	0	------	0	------	0	1	0	0	0	0	1
Helena	0	0	------	0	1	0	0	0	0	0	0	6
Missoula	0	0	------	0	------	0	0	0	0	0	0	------
Colorado:												
Denver	2	0	------	0	4	0	2	0	5	0	0	36
Pueblo	0	0	------	0	1	0	1	0	0	0	0	17
Utah:												
Salt Lake City	0	0	------	0	7	0	2	0	1	0	1	3

City reports for week ended August 9, 1947—Continued

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	------	0	3	0	0	0	0	0	0	8
Spokane	0	0	------	0	1	0	1	4	0	0	0	1
California:												
Los Angeles	0	0	2	0	3	1	2	6	9	0	0	35
Sacramento	2	0	1	1	------	0	0	0	0	0	0	3
San Francisco	0	0	------	0	5	0	3	0	7	0	0	1
Total	20	6	12	3	238	10	203	87	113	0	26	1,240
Corresponding week, 1946*	55	------	12	5	308	------	206	------	139	0	18	686
Average 1942-46*	43	------	18	[2] 5	[3] 314	------	[2] 207	------	185	0	28	898

*Exclusive of Oklahoma City.
[2] 3-year average, 1944-46.
[3] 5-year median, 1942-46.

Dysentery, amebic.—Cases: New York 3; Philadelphia 1; Detroit 1; Nashville 1; Houston 2.
Dysentery, bacillary.—Cases: New York 8; Richmond 1.
Dysentery, unspecified.—Cases: Columbus 1; San Antonio 7.
Rocky Mountain spotted fever.—Cases: Birmingham 1.
Typhus fever, endemic.—Cases: Tampa 3; New Orleans 3; Houston 2; Los Angeles 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (latest available estimated population, 34,002,300)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	2.6	0.0	0.0	0.0	42	2.6	15.8	42.0	21	0.0	7.9	242
Middle Atlantic	2.8	2.8	1.9	0.5	34	1.9	28.7	5.1	15	0.0	3.2	110
East North Central	3.9	0.0	0.0	0.0	47	1.3	24.4	21.2	19	0.0	1.3	230
West North Central	0.0	0.0	0.0	0.0	70	0.0	57.7	13.9	12	0.0	9.9	452
South Atlantic	3.3	0.0	6.5	0.0	11	1.6	34.3	11.4	16	0.0	8.2	281
East South Central	0.0	0.0	0.0	5.9	12	0.0	59.0	17.7	12	0.0	5.9	94
West South Central	2.5	0.0	2.5	0.0	13	2.5	63.5	0.0	8	0.0	5.1	71
Mountain	16.5	0.0	0.0	0.0	116	0.0	49.6	0.0	50	0.0	8.3	520
Pacific	3.3	0.0	4.9	1.6	20	1.6	9.9	16.4	26	0.0	0.0	79
Total	3.1	0.9	1.8	0.5	37	1.5	31.2	13.4	17	0.0	4.9	191

PLAGUE INFECTION IN CALIFORNIA AND COLORADO

Plague infection has been reported proved in pools of fleas from ground squirrels and prairie dogs collected in San Luis Obispo County, California, and Park County, Colorado, as follows:

CALIFORNIA

San Luis Obispo County.—Proved positive for plague on August 8, a pool of 109 fleas from 9 ground squirrels, a pool of 200 fleas from 75

ground squirrels, and a pool of 200 fleas from 9 ground squirrels, all *Citellus beecheyi* and all taken from a ranch 1 mile north of Santa Margarita.

COLORADO

Park County.—Proved positive on July 29, a pool of 113 fleas from 48 prairie dogs, *Cynomys* sp., taken at Vestal, 20 miles south and 3 miles east of Fairplay; and proved positive on July 30, a pool of 31 fleas from 11 prairie dogs, same species, taken 10 miles south of Fairplay, on U. S. Highway No. 285.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 26, 1947.—During the week ended July 26, 1947, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		13	3	50	55	19	15	31	55	241
Diphtheria			1	10	2			1	2	16
Dysentery:										
Bacillary				1						1
Unspecified									4	4
Encephalitis, infectious					1					1
German measles				1	10			1	1	13
Influenza		36			4	2			2	44
Measles		1		49	66	54	13	18	27	228
Meningitis, meningococcus				1						1
Mumps		15		6	372	21	15	12	20	461
Poliomyelitis			2	1	11	18	4	1	24	61
Scarlet fever		2	5	38	15	3	1	2		66
Tuberculosis (all forms)			5	106	36	41	17	35	48	288
Typhoid and paratyphoid fever		1		9						17
Undulant fever				3	2			3		8
Venereal diseases:										
Gonorrhea	2	16	8	101	100	52	19	59	74	431
Syphilis	1	11	6	50	73	18	11	11	19	200
Other forms									4	4
Whooping cough				28	48	41	1	12	41	171

FINLAND

Notifiable diseases—May 1947.—During the month of May 1947, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	16	Paratyphoid fever	283
Diphtheria	424	Poliomyelitis	9
Dysentery	13	Scarlet fever	263
Gonorrhea	1,184	Syphilis	397
Malaria	20	Typhoid fever	125

GREAT BRITAIN

England and Wales—Poliomyelitis.—For the week ended August 2, 1947, 487 cases of poliomyelitis were reported in England and Wales, bringing the total to that date to approximately 1,612, as compared with 1,489 cases for the year 1938. Apparently the present epidemic is the worst in the experience of that country. No information is available as to whether all cases being reported are paralytic.

NORWAY

Notifiable diseases—April 1947.—During the month of April 1947, cases of certain notifiable diseases were reported in Norway as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	10	Mumps	538
Diphtheria	102	Paratyphoid fever	2
Dysentery	5	Pneumonia (all forms)	2,485
Encephalitis, epidemic	4	Poliomyelitis	11
Erysipelas	425	Rheumatic fever	188
Gastroenteritis	4,137	Scabies	3,552
Gonorrhea	634	Scarlet fever	449
Hepatitis, epidemic	287	Syphilis	132
Impetigo contagiosa	2,985	Tuberculosis (all forms)	448
Influenza	3,768	Typhoid fever	5
Measles	43	Whooping cough	822

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during recent months. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Cholera

Siam (Thailand).—For the week ended July 5, 1947, 245 cases of cholera with 166 deaths were reported in Siam (Thailand).

India—Lucknow.—For the week ended July 5, 1947, 120 cases of cholera with 21 deaths were reported in Lucknow, India.

Plague

Egypt—Alexandria.—For the week ended July 19, 1947, 3 cases of plague were reported in Alexandria, Egypt.

Korea.—For the month of April 1947, 22 cases of plague were reported in Korea.

Union of South Africa—Transvaal—Johannesburg.—Information dated July 19, 1947, states that 2 cases of pneumonic plague were reported in the municipal area of Johannesburg, Transvaal, Union of South Africa.

Typhus Fever

Rumania.—For the week ended June 21, 1947, 726 cases of typhus fever were reported in Rumania, including 29 cases reported in Bucharest.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

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It contains (1) current information regarding the incidence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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